Sparkle Power Inc

600-650 WATT MEDICAL POWER SUPPLIES

DESCRIPTION

This series of AC-DC switching power supplies in a package of 4 x 8 x 2.58 inches are capable of delivering 600-650 watts of continuous power at 30 CFM forced air cooling. The units are constructed on a printed circuit board with a U-bracket for mechanical support and heat sinking. A cover and fan assembly can be added during manufacturing. They are designed for medical applications including those needing BF rated insulation and/or an operation altitude up to 5000 meters.

FSP650M-K48 SERIES

CE

RoHS

FEATURES

- BF Class insulation
- EN55011 Class B conducted emissions
- Standby output 5Vdc at 200mA
- Output inhibit control & power failed indication
- High altitude 5000 meters operation
- Output voltage sense detection
- OVP, OCP, OTP protection
- Fan driver 12Vdc output

SAFETY STANDARD APPROVALS

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	8.4 A (rms) @115 VAC, 60 Hz 4.2 A (rms) @ 230 VAC, 50 Hz
Earth leakage current:	300 μA max. @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Remote sense	Compensation for cable losses up to 0.5V
Protection:	
OVP	Latch off
OCP & Shorted:	Auto recovery
OTP	Latch off
Temperature coefficient:	All outputs ±0.04% /℃ maximum
Transient response:	Maximum excursion of 4%, recovering to 1% of final value within 500 us after a 25% step load change
Standby power	5 V at 200 mA maximum
Fan power	12 V at 500 mA maximum

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10℃ to +70℃
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50℃ linearly to 50% at +70℃, applicable to convection and forced-air cooling conditions

GENERAL SPECIFICATIONS

Switching frequency:	85 KHz (typical)
Power Factor:	0.98 typical
Efficiency:	Typical 88%
Hold-up time:	12 ms minimum at 110 VAC & 650 W
Line regulation:	±0.5% maximum at full load
Inrush current:	20 A @ 115 VAC, or 40 A @ 230 VAC, at 25℃ cold start
Withstand voltage:	4000 VAC from input to output (2 MOPP) 1500 VAC from input to ground (1 MOPP) 1500 VAC from output to ground
MTBF:	250,000 hours at full load at 25℃ ambient, calculated per MIL-HDBK-217F

EMC Performance

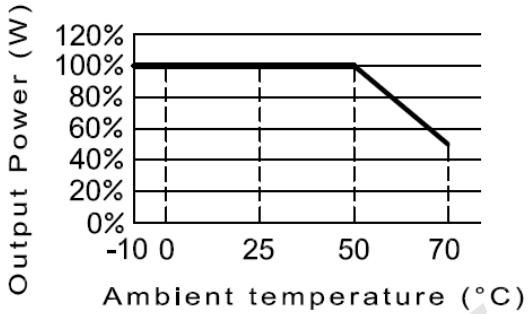
EN55011	Class B conducted, class A radiated
FCC:	Class B conducted, class A radiated
VCCI:	Class B conducted, class A radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±8 KV air and ±6 KV contact
EN61000-4-3:	Radiated immunity, 3 V/m
EN61000-4-4:	Fast transient/burst, ±2 KV
EN61000-4-5:	Surge, ±1 KV diff., ±2 KV com
EN61000-4-6:	Conducted immunity, 3 Vrms
EN61000-4-8:	Magnetic field immunity, 3 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms, 60% reduction for 100 ms and >95% reduction for 10 ms

INTERFACE SIGNALS

PFD: Output signal, this signal appears at least 1ms prior to V1 output dropping 5% below its nominal value and 100 ms minimum delay after V1 is within regulation.
TTL logic high for normal operation and TTL logic low upon loss of input power.

Inhibit: Input signal, requires an external TTL high level to inhibit outputs

OUTPUT POWER DERATING CURVE



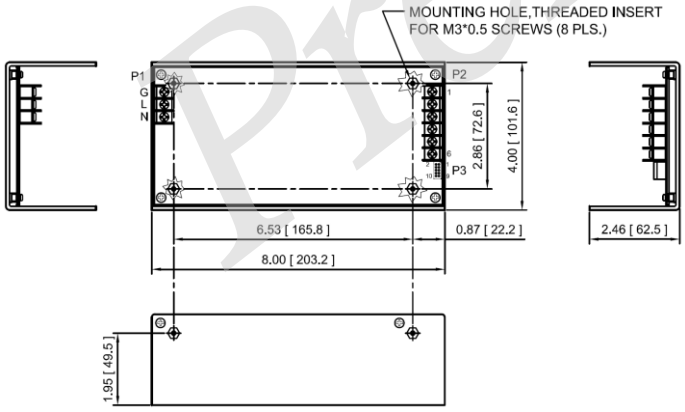
OUTPUT VOLTAGE/CURRENT RATING CHART

	Output							Efficiency (typical)
Model[1]	V1	Min. Current[2]	Max. Current at 30 CFM[3]	Peak current[5]	Tol.	Ripple & Noise[4]	Max. Output Power[3]	@600-650W 115/230 Vac
FSP600M-K48-12B	12 V	0.1 A	50.00 A	55.0 A	±2%	120 mV	600 W	87 /89%
FSP600M-K48-15B	15 V	0.1 A	40.00 A	44.0 A	±2%	150 mV	600 W	87 /89%
FSP650M-K48-18B	18 V	0.1 A	36.12 A	40.0 A	±2%	180 mV	650 W	87 /89%
FSP650M-K48-24B	24 V	0.1 A	27.09 A	30.0 A	±2%	240 mV	650 W	86 /88%
FSP650M-K48-28B	28 V	0.1 A	23.22 A	25.5 A	±2%	280 mV	650 W	86 /88%
FSP650M-K48-36B	36 V	0.1 A	18.06 A	20.0 A	±2%	360 mV	650 W	86 /88%
FSP650M-K48-48B	48 V	0.1 A	13.55 A	15.0 A	±2%	480 mV	650 W	88 /89%
FSP650M-K48-57B	57 V	0.1 A	11.41 A	12.5 A	±2%	570 mV	650 W	88 /89%

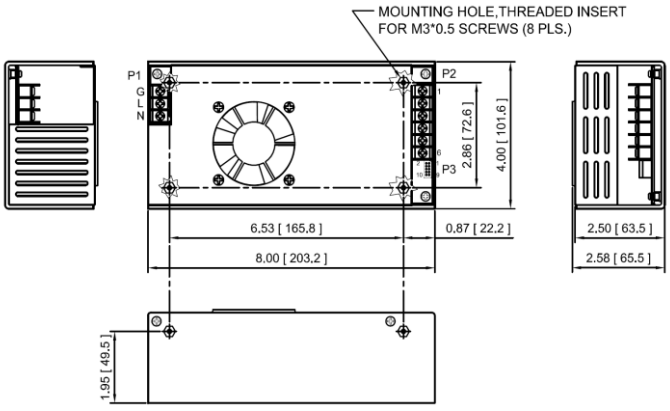
NOTES:
1. Change suffix “B” for U-Bracket form to “C” for enclosed form with cover and fan assembly, e.g. FSP600M-K48-24C.
2. All models may be operated at no-load without damage. At no load, output voltage fluctuates beyond 5% due to the burst-mode operation of the control IC in them for energy saving.
3. 600-650 W for “C” version, or with 30 CFM forced air provided by user for “B” version
4. Ripple and noise is maximum peak-to-peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10 µF tantalum capacitor in parallel with a 0.1 µF ceramic capacitor across the output.
5. Peak output current with 10% duty cycle maximum for less than 15 seconds, average power not to exceed maximum power rating.

MECHANICAL SPECIFICATIONS

U-bracket Form



Enclosed Form



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Dinkle terminal P/N DT-35-B01W-03, with nickel plated M3 screws.
4. Output connector P2 is Dinkle terminal P/N DT-4N-B01W-06, with nickel plated M3.5 screws.
5. Output connector P3 is JST header B10B-PHDSS or equivalent, mating with JST housing PHDR-10VS or equivalent.
6. Fan connector P4 is JST header S2B-ZR-3.4 or equivalent, mating with JST housing ZHR-2 or equivalent.
7. Maximum penetration of fixing screws is 4 mm from the outer surface of chassis.

PIN CHART

Connector	P1 (AC)			P2						P4	
PIN NO	1	2	3	1	2	3	4	5	6	1	2
Polarity	Ground	Live	Neutral	+V1			Common Return			+12V Fan	Common Return

Connector	P3									
PIN NO	1	2	3	4	5	6	7	8	9	10
Polarity	+V1 Sense	-V1 Sense	PFD	Common Return	N.A.	N.A.	Inhibit	N.A.	+5V Standby	+5V Standby Return

Weight:

1.8 Kgs (3.97 lbs.) approx. for U-bracket form.
2.0 Kgs. (4.41 lbs.) approx. for enclosed form.