220-250 WATT MEDICAL POWER SUPPLIES

DESCRIPTION

The FSP250M series of AC/DC switching power supplies are for 220-250 watts of continuous output power. They are enclosed in a 94V-0 rated polyphenylene-oxide case with an IEC320/C14 or C18 inlet to mate with interchangeable cord for world-wide use. All models meet EN 55011 class B emission limits, and are designed for medical applications.

FSP250M SERIES

RoHS

VI

FEATURES

- No load power consumption less than 0.15W
- Compliant with DoE level VI / CoC EPS V5 tier 2 requirements
- With PFC circuit
- Operating altitude up to 5000 meters
- Wide input range 80 to 264 VAC
- 100% burn-in
- Overvoltage protection
- Overcurrent protection
- Compliant with RoHS requirements

SAFETY STANDARD APPROVALS

c UL us E 178020 — UL ES 60601-1, CSA C22.2 No. 60601-1 File No. E178020

TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	80-264 VAC
Power derating	Derate linearly from 100% at 90 VAC to 90% at 85Vac and 80% at 80 VAC
Input frequency:	47-63 Hz
Input current:	2.5 A (rms) for 115 VAC 1.25 A (rms) for 230 VAC
Earth leakage current:	220 μA max. @ 264 VAC, 63 Hz
Touch current:	100 μA max. @ 264 VAC, 63 Hz

GENERAL SPECIFICATIONS

Switching frequency:	50-130 KHz
Power factor:	0.98 Typical at 115 VAC
Efficiency:	89% min. at full load
Hold-up time:	20 ms minimum at 100 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	130 A @ 115 VAC or 260 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) 500 VAC from output to ground (For class II models, 4000VAC from input to output)
MTBF:	100,000 hours at full load at 25℃ ambient , calculated per MIL-HDBK-217F

OUTPUT SPECIFICATIONS

Output voltage /current:	See rating chart.
Maximum output power:	See rating chart.
Ripple and noise:	1% peak to peak maximum
Overvoltage protection:	Provided and set at 112-140% of its nominal output voltage
Overcurrent protection:	Protected to short circuit conditions
Temperature coefficient:	±0.04% /℃ maximum
Transient response:	Maximum excursion of 4% or better on all models, recovering to 1% of final value within 500 us after a 25% step load change

EMC Performance (IEC60601-1-2)

EN55011:	Class B conducted, class B radiated
FCC:	Class B conducted, class B radiated
VCCI:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, ±15 KV air and ±8 KV contact
EN61000-4-3:	Radiated immunity, 10 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, 10 Vrms
EN61000-4-8:	Magnetic field immunity, 30 A/m
EN61000-4-11:	Voltage dip immunity, 30% reduction for 500 ms (criteria A @ 230VAC, criteria B @ 100VAC), 60% reduction for 100 ms (criteria A @ 230VAC, criteria B @ 100VAC) and >95% reduction for 20 ms

ENVIRONMENTAL SPECIFICATIONS

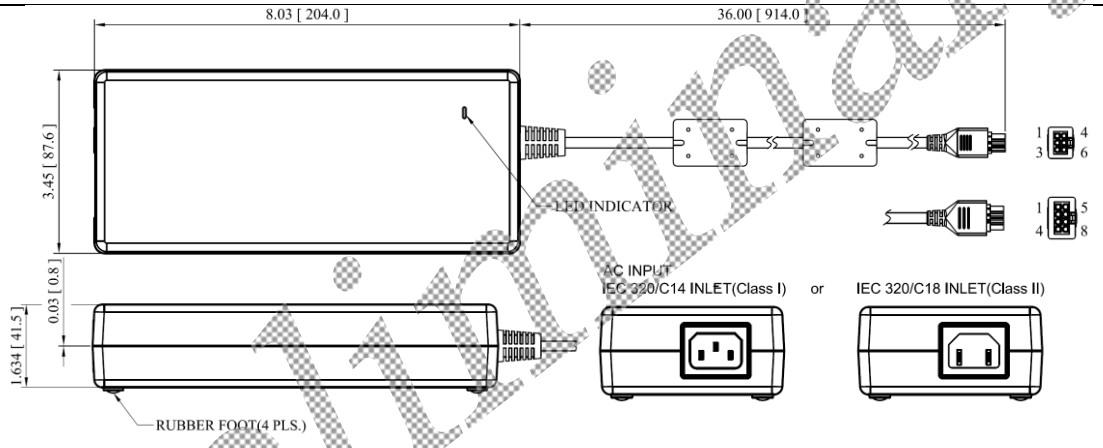
Operating temperature:	-20℃ to +60℃
Atmospheric pressure	540 hPa to 1060 hPa
Storage temperature:	-40℃ to +85℃
Relative humidity:	5% to 95% non-condensing
Temperature derating:	Derate from 100% at +40℃ linearly to 50% at +60℃

OUTPUT VOLTAGE/CURRENT RATING CHART

Model[1]		Output						Average Active Efficiency (typical) @ 115 / 230 Vac
Class I	Class II	V1	Min. Current	Max. Current	Tol.	Ripple & Noise[2]	Max. Power	
FSP250M-KHA	FSP250M-KHD	12 V	0 A	18.34 A	±5%	120 mV	220 W	89 /89%
FSP250M-KGA	FSP250M-KGD	15 V	0 A	14.67 A	±5%	150 mV	220 W	89 /89%
FSP250M-KDA	FSP250M-KDD	18 V	0 A	13.89 A	±5%	180 mV	250 W	89 /89%
FSP250M-KBA	FSP250M-KBD	19 V	0 A	13.16 A	±5%	190 mV	250 W	89 /89%
FSP250M-KCA	FSP250M-KCD	20 V	0 A	12.50 A	±5%	200 mV	250 W	89 /89%
FSP250M-KAA	FSP250M-KAD	24 V	0 A	10.42 A	±5%	240 mV	250 W	90 /90%
FSP250M-KLA	FSP250M-KLD	30 V	0 A	8.34 A	±5%	300 mV	250 W	90 /90%
FSP250M-KEA	FSP250M-KED	36 V	0 A	6.95 A	±5%	360 mV	250 W	90 /90%
FSP250M-KFA	FSP250M-KFD	48 V	0 A	5.21 A	±5%	480 mV	250 W	90 /90%
FSP250M-KWA	FSP250M-KWD	54 V	0 A	4.63 A	±5%	540 mV	250 W	90 /90%

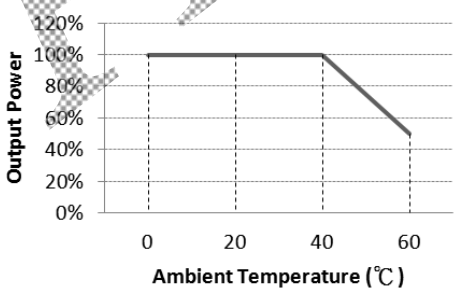
NOTES:
1. Class I models are equipped with IEC320/C14 inlet, and Class II models with IEC320/C18 inlet.
2. Ripple and noise is maximum peak to peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 47 µF electrolytic capacitor in parallel with a 0.1 µF ceramic capacitor across the output.

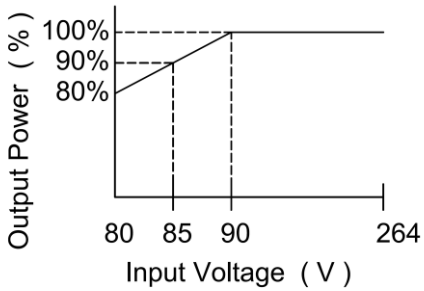
MECHANICAL SPECIFICATIONS



NOTES:
1. Dimensions shown in inches [mm]
2. Tolerance 0.02 [0.5] maximum
3. Weight: 1100 grams (2.425 lbs.) approx.
4. Output connector is Molex Mini - Fit receptacle, P/N: 39-01-2060 (or P/N: 39-01-2080) with female terminal #5556 or equivalent, mating with Molex plug 39-01-2066 (or P/N: 39-01-2086) and male terminal #5558 or equivalent. It also mates with Molex headers #5566, #5569, or equivalent.

OUTPUT POWER DERATING CURVE





PIN CHART (output 18Vdc to 54Vdc)

PIN	1	2	3	4	5	6
1 3 4 6	+V1	V1 Return	V1 Return	+V1	+V1	V1 Return

PIN CHART (output 12Vdc and 15Vdc)

PIN	1	2	3	4	5	6	7	8
1 4 5 8	+V1	V1 Return	V1 Return	V1 Return	+V1	+V1	+V1	V1 Return