



## FSP500M-K47 Series

### FEATURES

- Compact size 4 x 7 x 1.7 inches
- Certified medical safety IEC 60601-1
- High altitude 5000 meters operation
- Power Fail Detect (PFD) signal
- Inhibit – TTL high to disable output
- BF Class insulation
- Meet EN55011 and FCC Class B
- Over voltage protection
- Over current protection
- Over temperature protection
- Compliant with RoHS requirement

### SAFETY STANDARD APPROVAL



### DESCRIPTION

The FSP500M-K47 series is Class-I design in 4 x 7 inches, AC/DC switching power supplies are capable of delivering 450-500 watts of continuous output power at 30 CFM forced air cooling or 350-400 watts at convection cooling. The unit is constructed on a printed circuit board with U-bracket or enclosed form for mechanical support. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

### INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	< 5.2 A (rms) for 115 VAC < 2.6 A (rms) for 230 VAC
Earth leakage current:	< 300 $\mu$ A @ 264 VAC, 63 Hz
Touch current:	< 100 $\mu$ A @ 264 VAC, 63 Hz

### OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart
Maximum output power:	See rating chart
Remote sense:	Compensation for cable losses up to 0.5 V
Protection:	
Over voltage:	Provided on output. Set at 112% to 140% of its nominal output voltage.
Over current:	The power supply will shut down without damage and enter auto-recovery mode.
Over temperature:	The power supply will enter into shut down while the abnormal thermal rise occurs.
Temperature coefficient:	All outputs $\pm 0.04\%$ / $^{\circ}$ C maximum.
Transient response:	Maximum excursion of 4%, recovering to 1% of final value within 500 $\mu$ s after a 25% step load change.
Fan power:	12 V at 300 mA maximum
Standby power:	5 V at 500 mA maximum

### ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	-10 $^{\circ}$ C to +70 $^{\circ}$ C
Storage temperature:	-40 $^{\circ}$ C to +85 $^{\circ}$ C
Operating humidity:	10% to 90% RH non-condensing
Storage humidity:	5% to 95% RH non-condensing
Temperature derating:	Derate from 100% at +50 $^{\circ}$ C linearly to 50% at +70 $^{\circ}$ C, applicable to convection and forced-air cooling conditions

### GENERAL SPECIFICATIONS

Switching frequency:	85 KHz (typical)
Power factor:	0.98 typical at 115 VAC
Efficiency:	See rating chart
Hold-up time:	20 ms minimum at 110 VAC
Line regulation:	$\pm 0.5\%$ maximum at full load
Inrush current:	30 A @ 115 VAC, or 60 A @ 230 VAC, at 25 $^{\circ}$ C cold start
Operating altitude :	5000 meters
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:	100,000 hours at full load at 25 $^{\circ}$ C ambient , calculated per MIL-HDBK-217F
EMC Performance (IEC60601-1-2)	
EN55011:	Class B conducted, class B radiated
EN61000-3-2:	Harmonic distortion, Class A and D
EN61000-3-3:	Line flicker
EN61000-4-2:	ESD, $\pm 15$ KV air and $\pm 8$ KV contact
EN61000-4-3:	Radiated immunity, 10 V/m
EN61000-4-4:	Fast transient/burst, $\pm 2$ KV
EN61000-4-5:	Surge, $\pm 1$ KV diff., $\pm 2$ 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, 60% reduction for 100 ms, and >95% reduction for 10 ms

### OUTPUT VOLTAGE/CURRENT RATING CHART

Model <sup>(1)</sup>	Output							Average Active Efficiency (typical) @ 115 / 230 VAC
	V1	Min. Current	Max. Current at convection	Max. Current at 30 CFM	Tolerance	Ripple & Noise <sup>(2)</sup>	Max. Power <sup>(3)</sup>	
FSP500M-K47-12B	12 V	0 A	29.17 A	37.50 A	±2%	120 mV	350 W / 450 W	88% / 90%
FSP500M-K47-15B	15 V	0 A	23.34 A	30.00 A	±2%	150 mV	350 W / 450 W	88% / 90%
FSP500M-K47-18B	18 V	0 A	22.23 A	27.78 A	±2%	180 mV	400 W / 500 W	88% / 90%
FSP500M-K47-24B	24 V	0 A	16.67 A	20.84 A	±2%	240 mV	400 W / 500 W	89% / 91%
FSP500M-K47-28B	28 V	0 A	14.29 A	17.86 A	±2%	280 mV	400 W / 500 W	89% / 91%
FSP500M-K47-36B	36 V	0 A	11.12 A	13.89 A	±2%	360 mV	400 W / 500 W	89% / 91%
FSP500M-K47-48B	48 V	0 A	8.34 A	10.42 A	±2%	480 mV	400 W / 500 W	89% / 91%
FSP500M-K47-57B	57 V	0 A	7.02 A	8.78 A	±2%	570 mV	400 W / 500 W	89% / 91%

#### NOTES:

1. Change suffix "B" for U-bracket form to "C" for enclosed form with cover and fan assembly, e.g. FSP500M-K47-12C.

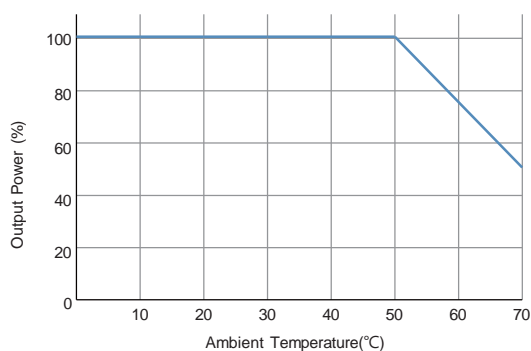
2. Ripple and noise is maximum peak-to-peak voltage value measured at output within 20 MHz bandwidth, at rated line voltage and output load ranges, and with a 10  $\mu$ F tantalum capacitor in parallel with a 0.1  $\mu$ F ceramic capacitor across the output.

3. 350 W or 400 W of max. output power is at convection cooling, 450 W or 500 W is with 30 CFM forced air provided by user for "B" version . 450 W or 500 W for "C" version with cover and fan assembly.

### INTERFACE SIGNALS

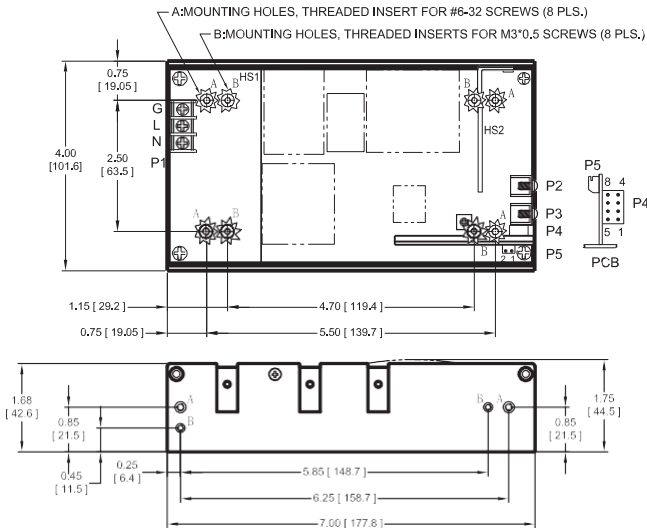
PFD	TTL logic high for normal operation and TTL logic low upon loss of input power. Turn-on delay time 100-1000 ms, turn-off delay time 1 ms minimum.
Inhibit	TTL high level signal to inhibit output.

### OUTPUT POWER DERATING CURVE

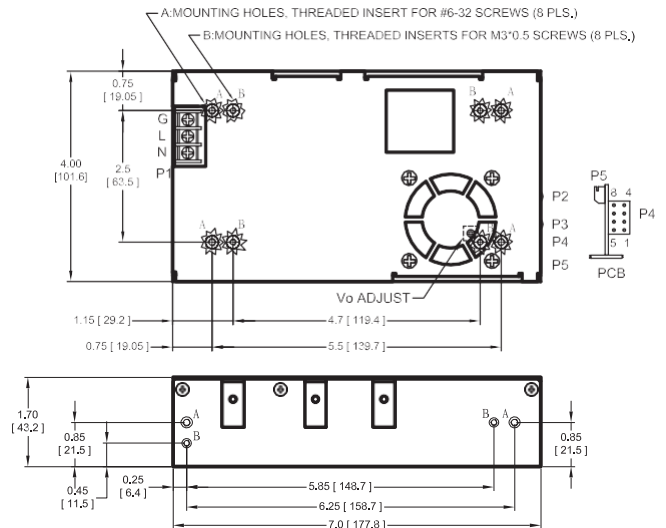


### MECHANICAL SPECIFICATIONS

#### 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-35C-B01W-03, with nickel plated M3 screws.
4. Output connectors P2 and P3 are for M4x0.7 screw connections.
5. Output connector P4 is Molex header 87833-08 or equivalent, mating with Molex housing 51110-0850 or equivalent.
6. Fan connector P5 is JST header S2B-ZR-3.4 or equivalent, mating with JST housing ZHR-2 or equivalent.
7. Maximum penetration depth of fixing screws is 4 mm from the outer surface of chassis.
8. Weight: 1.0 Kgs (2.23 lbs.) approx. for U-bracket form, 1.14 Kgs (2.52 lbs.) approx. for enclosed form.

#### PIN CHART

Connector	P1			P2	P3	P5	
Pin No.	1	2	3			1	2
Polarity	Ground	Live	Neutral	+V1	Common Return	Common Return	+12V Fan

Connector	P4							
Pin No.	1	2	3	4	5	6	7	8
Polarity	Common Return	+V1 Sense	-V1 Sense	PFD	Inhibit	+5V Standby	NC	NC