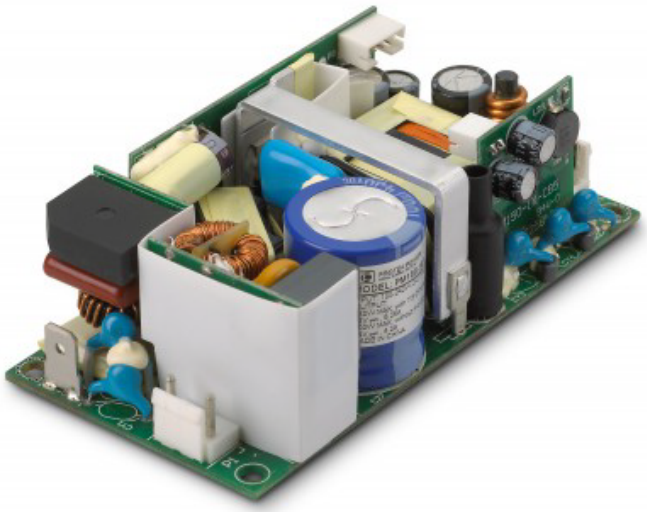
TECHNICAL DATASHEET

150W Medical Open Frame

FSP150M-K24 Series



FSP150M-K24 Series

FEATURES

- Compact size 2 x 4 x 1.29 inches
- Certified medical safety IEC 60601-1
- Wide operation voltage 80-264 VAC
- High altitude 5000 meters operation
- Optional Power Fail Detect (PFD) signal
- 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

E178020

DESCRIPTION

The FSP150M-K24 series is Class-I design in 2 x 4 inches, open PCB constructed, AC/DC switching power supplies are capable of delivering 150 watts of continuous output power at 7.5 CFM forced air cooling or 100 watts at convection cooling. All models meet EN55011 and FCC class B emission limits, and are designed for medical applications.

INPUT SPECIFICATIONS

Input voltage:	80-264 VAC
Input frequency:	47-63 Hz
Input current:	< 1.7 A (rms) for 115 VAC < 0.85 A (rms) for 230 VAC
Earth leakage current:	< 275 μA @ 264 VAC, 63 Hz
Touch current:	< 100 μA @ 264 VAC, 63 Hz

OUTPUT SPECIFICATIONS

Output voltage/current:	See rating chart
Maximum output power:	See rating chart
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 ±0.04% /℃ maximum.
Transient response:	Maximum excursion of 4% or better on all models, recovering to 1% of final value within 500μs after a 25% step load change.
Fan power:	12 V at 0.5A maximum (isolated)

ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0℃ to +70℃
Storage temperature:	-40℃ to +85℃
Operating humidity:	10% to 90% RH non-condensing
Storage humidity:	5% to 95% RH non-condensing
Temperature derating:	Derate from 100% at +50℃ linearly to 50% at +70℃, applicable to convection and forced-air cooling conditions

GENERAL SPECIFICATIONS

Switching frequency	133 KHz (typical)
Power factor:	0.98 typical
Efficiency:	See rating chart
Hold-up time:	10 ms minimum at 120 VAC
Line regulation:	±0.5% maximum at full load
Inrush current:	80 A @ 115 VAC, or 160 A @ 230 VAC, at 25℃ 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:	250,000 hours at full load at 25℃ ambient , calculated per MIL-HDBK-217F
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, 60% reduction for 100 ms, and >95% reduction for 10 ms

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OUTPUT VOLTAGE/CURRENT RATING CHART

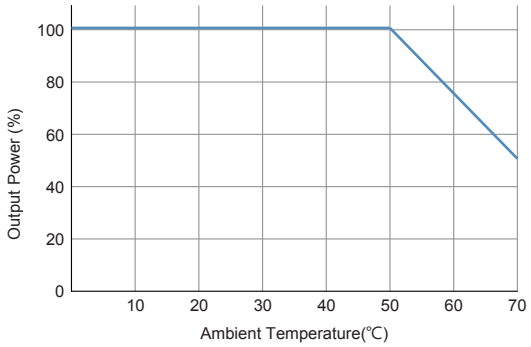
Model	Output								Average Active Efficiency (typical) @ 115 / 230 VAC
	V1	Min. Current	Max. Current at convection	Max. Current at 7.5 CFM	Peak[1] Current	Tolerance	Ripple & Noise[2]	Max. Power[3]	
FSP150M-K24-12	12 V	0 A	8.35 A	12.50 A	14.00 A	±2%	120 mV	100 W / 150 W	90% / 92%
FSP150M-K24-15	15 V	0 A	6.70 A	10.00 A	11.00 A	±2%	150 mV	100 W / 150 W	89% / 91%
FSP150M-K24-18	18 V	0 A	5.56 A	8.34 A	9.20 A	±2%	180 mV	100 W / 150 W	91% / 92%
FSP150M-K24-24	24 V	0 A	4.20 A	6.25 A	7.00 A	±2%	240 mV	100 W / 150 W	89% / 92%
FSP150M-K24-30	30 V	0 A	3.34 A	5.00 A	5.60 A	±2%	300 mV	100 W / 150 W	89% / 92%
FSP150M-K24-36	36 V	0 A	2.78 A	4.17 A	4.60 A	±2%	360 mV	100 W / 150 W	90% / 92%
FSP150M-K24-48	48 V	0 A	2.10 A	3.13 A	3.50 A	±2%	480 mV	100 W / 150 W	89% / 92%

NOTES:
1. Peak output current with 10% duty cycle maximum for less than 15 seconds, average power not to exceed maximum power rating.
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 µF tantalum(or electrolytic) capacitor in parallel with a 0.1 µF ceramic capacitor across the output except model FSP150M-K24-12 which is with 47µF tantalum(or electrolytic) capacitor in parallel with a 0.1 µF ceramic capacitor across the output.
3. The first value of max. output power is at convection cooling. The second value is with 7.5 CFM forced air provided by user.

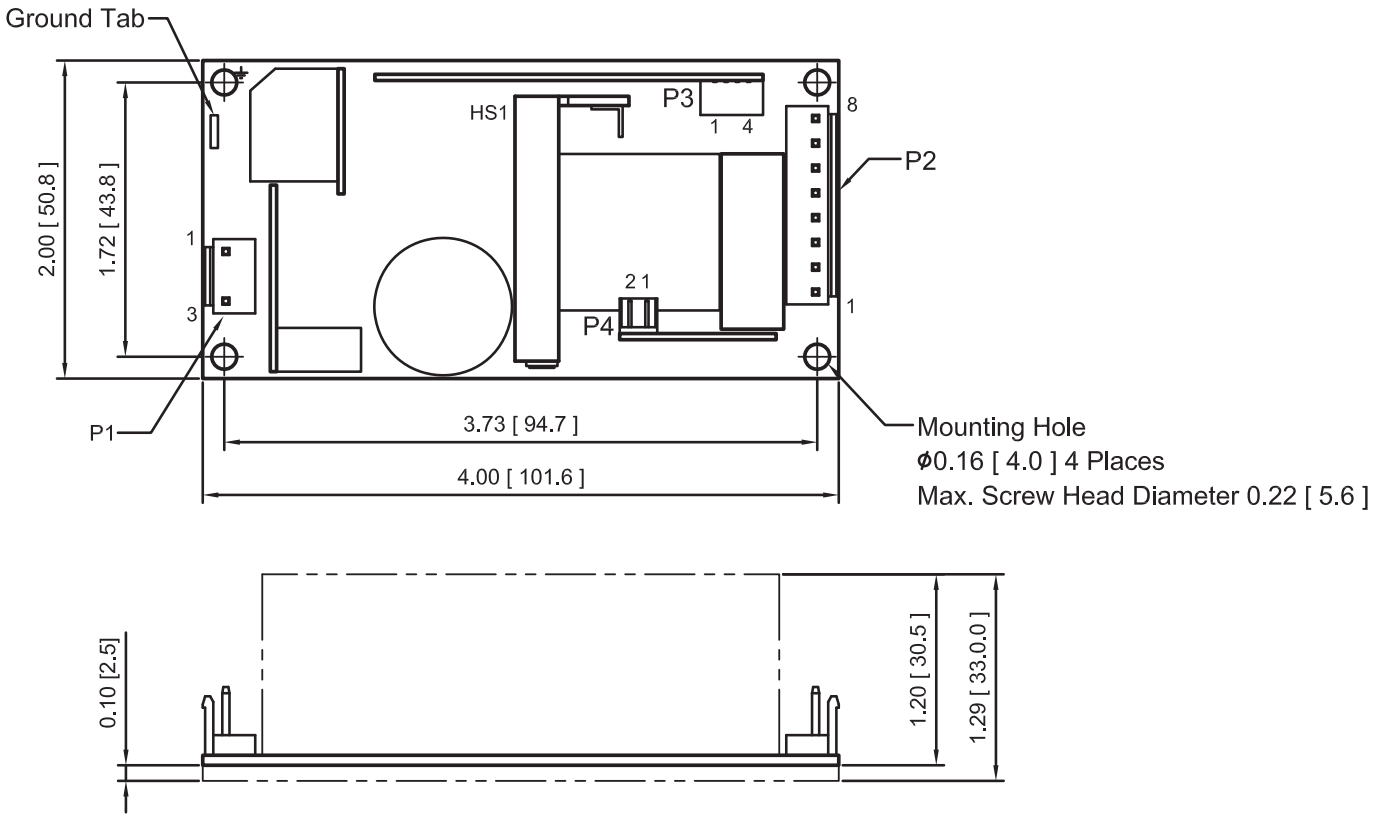
INTERFACE SIGNALS

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

OUTPUT POWER DERATING CURVE



MECHANICAL SPECIFICATIONS



NOTES:
1. Dimensions shown in inches [mm].
2. Tolerance 0.02 [0.5] maximum.
3. Input connector P1: JST header P/N V3P-VH-B, mating with JST housing P/N VHR-3N or equivalent.
4. Output connector P2: JST header P/N V8P-VH-B, mating with JST housing P/N VHR-8N or equivalent.
5. Connector P3: JST header B4B-PH-K-S (LF) (SN) , mating with JST housing PHR-4 or equivalent.
6. FAN connector P4: JST header B2B-PH-K-S (LF) (SN) , mating with JST housing PHR-2 or equivalent.
7. Ground tab is 0.25 [6.35] × 0.032 [0.8] fast-on connector.
8. To ensure compliance with level B emissions, connect the three ”＊” marked mounting holes with metallic standoffs to chassis.
9. Weight: 200 grams (0.44 lbs.) approx.

PIN CHART

Connector	P1			P2							
Pin No.	1	2	3	1	2	3	4	5	6	7	8
Polarity	Neutral	Void	Live	Common Return				+V1			

Connector	P3				P4	
Pin No.	1	2	3	4	1	2
Polarity	Common Return	PFD (Optional)	-Sense	+Sense	Fan Return (Isolated)	+12V Fan