

DESCRIPTION

This AC-DC switching power supplies series in a package of 4x7x1.58 inches is a single output with +5Vsb PSU. The single main output is capable of delivering 400 watts continuous power at 7 CFM forced air cooling or 300 watts at convection cooling. Two form factors are supported as U-Bracket or Enclosed with fan assembly.

FSP400 M1 SERIES



RoHS



FEATURES

- BF Class insulation
- 4 x 7 x 1.58 inch profile
- Meet EN55011 / 55022 and FCC Class B
- OVP, OCP, OTP protection
- Efficiency 92% typical
- Output inhibit control & power failed indication
- Output voltage sense
- Standby output 5Vdc at 100mA
- 7 CFM low forced air for 400W output
- High altitude 5000 meters operation
- Fan power 12Vdc

SAFETY STANDARD APPROVALS



UL 60601-1, CSA C22.2 No. 601.1
File No. E178020



TÜV EN 60601-1

INPUT SPECIFICATIONS

Input voltage:	90-264 VAC
Input frequency:	47-63 Hz
Input current:	4.2 A (rms) @115 VAC, 60 Hz 2.1 A (rms) @ 230 VAC, 50 Hz
Earth leakage current:	300 µA max. @ 264 VAC, 63 Hz

GENERAL SPECIFICATIONS

Switching frequency:	85 KHz (typical)
Power factor:	0.98 typical
Efficiency:	Refer to rating table
Hold-up time:	12 ms minimum at 110 VAC & 400 W
Line regulation:	±0.5% maximum at full load
Inrush current:	20 A @ 115 VAC, or 40 A @ 230 VAC, at 25°C 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:	350,000 hours at full load at 25°C ambient, calculated per MIL-HDBK-217F
EMC Performance	
EN55011/EN55022:	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

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
OPP & Shorted	Auto recovery
OTP	Latch off
Temperature coefficient:	All outputs ±0.04% /°C 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 100 mA maximum
Fan power	12 V at 250 mA maximum

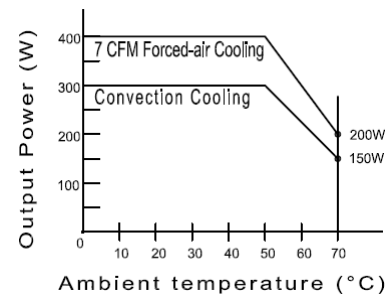
ENVIRONMENTAL SPECIFICATIONS

Operating temperature:	0°C to +70°C
Storage temperature:	-20°C to +85°C
Relative humidity:	5% to 95% non-condensing
Derating:	Derate from 100% at +50°C linearly to 50% at +70°C, applicable to convection and forced-air cooling conditions

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 high for normal operation, low upon loss of input power
- Inhibit:** Input signal, TTL low level to turn-off output
- PS OFF:** Input signal, TTL high level to turn-off output.
- DC OK:** Output signal, TTL high when main output voltage >95% rating.

OUTPUT POWER DERATING CURVE

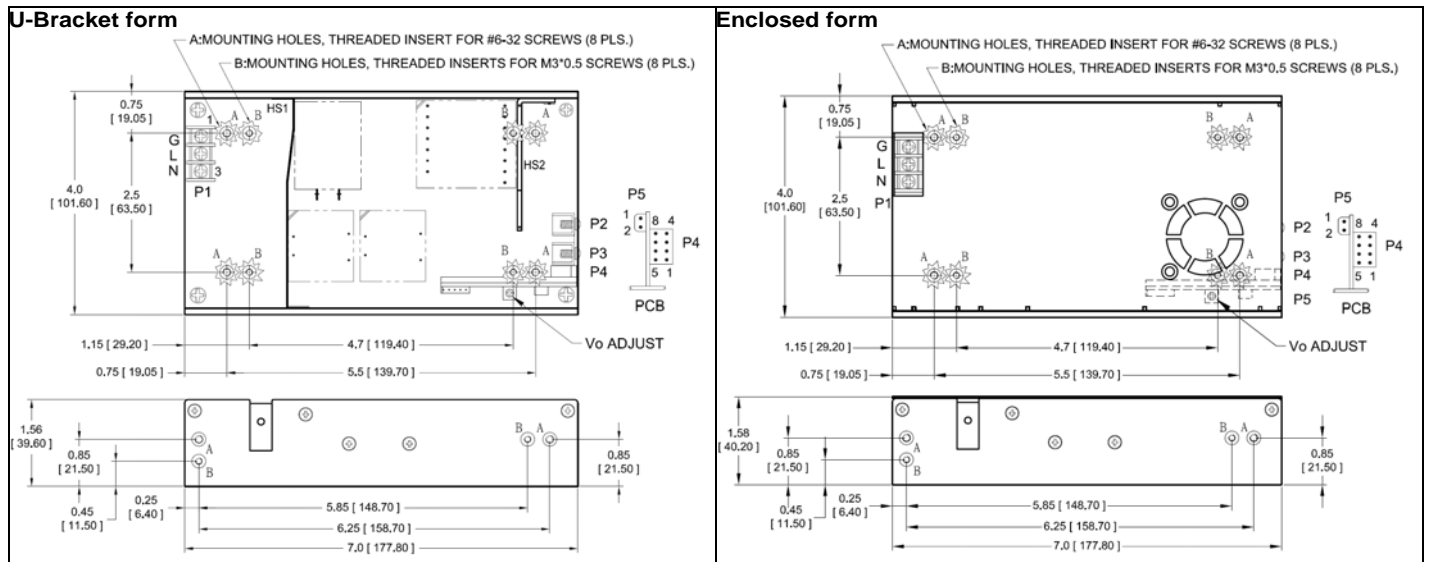


OUTPUT VOLTAGE/CURRENT RATING CHART

Model	Output							Efficiency (typical)	
	V1	Min. Current	Max. Current at convection	Max. Current at 7 CFM ⁽¹⁾	Tol.	Ripple & Noise ⁽²⁾	Max. Output Power	@ 300 W 115/230 Vac	@ 400 W 115/230 Vac
FSP400-1K20M1	12 V	0 A	25.00 A	33.34 A	±2%	120 mV	300 W/400 W	90/92 %	88/91 %
FSP400-1K30M1	15 V	0 A	20.00 A	26.67 A	±2%	150 mV	300 W/400 W	90/92 %	88/91 %
FSP400-1K31M1	18 V	0 A	16.67 A	22.23 A	±2%	180 mV	300 W/400 W	90/92 %	88/91 %
FSP400-1K40M1	24 V	0 A	12.50 A	16.67 A	±2%	240 mV	300 W/400 W	90/92 %	89/92 %
FSP400-1K50M1	28 V	0 A	10.72 A	14.29 A	±2%	280 mV	300 W/400 W	90/92 %	89/92 %
FSP400-1K70M1	36 V	0 A	8.34 A	11.12 A	±2%	360 mV	300 W/400 W	90/92 %	89/92 %
FSP400-1K80M1	48 V	0 A	6.25 A	8.34 A	±2%	480 mV	300 W/400 W	90/92 %	89/92 %

- NOTES: 1. Add "C" on the end for enclosed form with cover and fan assembly, e.g. FSP400-1K20M1C
2. 300 W without moving air or 400 W with 7 CFM forced air provided by user for "B" version, 400 W for "C" version with cover and fan assembly
3. 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.
4. 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.

MECHANICAL SPECIFICATIONS



NOTES:

- Dimensions shown in inches [mm]
- Tolerance 0.02 [0.5] maximum
- Input connector P1 is Dinkle terminal P/N DT-35-B01W-03, with nickel plated M3 screws.
- P2, P3: M4 x 0.7 screw connectors
- Connector P4: Molex header 87833-08 or equivalent, mating with Molex housing 51110-0850 or equivalent.
- Fan connector P5: JST header S2B-ZR-3.4 or equivalent, mating with JST housing ZHR-2 or equivalent.
- Maximum penetration depth of fixing screws is 4 mm from the outer surface of chassis.

CONNECTOR PIN CHART

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

Connector	P4							
PIN No.	1	2	3	4	5	6	7	8
Polarity	Common Return	+V1 Sense	-V1 Sense	PFD	Inhibit	+5V Standby	DC OK	PS OFF

Weight:

1.0 Kg (2.23 lbs.) approx. for U-bracket form,
 1.14 Kgs. (2.52 lbs.) approx. for enclosed form