

70050M5—800

(47—800Hz)

120W Multiple Output,
PFC Power Supply



Providing six independent output voltages and up to 120W continuous output power, the **70050M5-800** is optimized for wide frequency (47 – 800Hz) operation. Nominal line efficiency exceeds 70% at ½ to full output load and the supply is capable of providing full load power during momentary input AC brown-out conditions for up to 50mSec. This time is expandable by inclusion of an external capacitor bank attached to a two-pin connector provided within the supply. Additionally, the supply houses an intelligent Nickel Cadmium battery charger and isolated low voltage DC/DC converter with the ability to operate for up to five minutes at full rated load from an external 24Vdc (20Vdc-30Vdc) battery.

Weighing less than 32 ounces, the **70050M5-800** is housed in an aluminum enclosure with outer dimensions of 7.25" x 5.00" x 1.40". The top cover is perforated with two cover options: with or without recessed fan. The lower U-Chassis accepts five #4 screws to facilitate system mounting. Interconnection is accomplished with five Molex straight locking vertical connectors.



FEATURES

	Exceeds RTCA/DO-160E, section 16, and Airbus ABD0100.1.8, issue D for power factor and input current harmonic distortion levels over the wide operating frequency range of 360Hz to 8000Hz
	Efficiency: 73% typical, ½ to full rated output load, nominal line (115Vrms)
	Wide input range: 96Vrms – 134Vrms, 47Hz – 800Hz
	Complies with RTCA/DO-160E, category M for conducted emissions and susceptibility
	Active inrush current limiting: 7Apk
	Size: 7.25" x 5.00" x 1.40"; weight: less than 32 ounces
	Six standard outputs: +/-5V, +/-12V, 28Vdc, 24Vdc (battery charger)
	Independent over current protection on each output
	Built-in intelligent battery charger / operation from external 24Vdc battery
	AC status line (TTL)
	Output enable line (TTL)

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STANDARD OUTPUTS

PARAMETER	VALUE (TYPICAL)					
	+5.125V	+12V	-5V	-12V	+28V	+24Vbatt
Voltage Regulation	+/-2.5%	+/-5%	+/-5%	+/-5%	+/-5%	--
Output Current	10A	7A	1A	1A	300mA	600mA
Maximum Load	51W	84W	5W	12W	8W	16W
Minimum Load	1A	0	0	0	0	0
Pk-pk ripple + noise (20MHz)	100mVpp	120mVpp	50mVpp	120mVpp	120mVpp	120mVpp
Switched output	Yes	Yes	Yes	Yes	No	No
Over current trip-point	18A	7.5A	2.1A	2.1A	1A	600mA
Notes	(1), (4)	(2), (4)	(2), (4), (5)	(2), (4)	(2), (4)	(3), (4)

Notes:

1. Pulse-retry circuit limited to 3% duty cycle
2. Fold back current limited
3. 600mA constant current source
4. **Maximum supply (simultaneous) output power is limited to 120W using any combination of individual output current maximums provided.** A 5W minimum load is required on the 5V output in order to maintain proper cross-regulation.
5. -5V output voltage regulation is +/-5% for output current draw \leq 750mA and is +/-10% for output currents > 750mA.

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INTERCONNECTION

Connector	J1	J2	J3	J4	P2
Molex P/N Supply Side	43045-0612	39-29-9047	43045-1412	43045-0812	39-28-8020
1	AC Line	24Vbatt (+)	+5Vdc	Output Enable - H	+200Vdc
2	Chassis	24Vbatt (-)	+5Vdc	Battery Enable - H	+200V Return
3	AC Neutral	24Vbatt (+)	DC Return	Battery Low	
4	Chassis	24Vbatt (-)	+12Vdc	Ext Pwr Fail	
5	Chassis		DC Return	+28Vdc	
6	Chassis		-12Vdc	DC Return	
7			DC Return	DC Return	
8			+5Vdc	DC Return	
9			DC Return		
10			DC Return		
11			+12Vdc		
12			DC Return		
13			-5Vdc		
14			DC Return		

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ELECTRICAL SPECIFICATIONS

UNLESS OTHERWISE SPECIFIED THE FOLLOWING TEST CONDITIONS APPLY: Ta=25°C. ACTIVE LOADS APPLIED TO OUTPUT, VIN=115Vrms, 400Hz, < 1.25% THD SINUSOID

INPUT CHARACTERISTICS

PARAMETER	70050M5-800	REMARKS
INPUT VOLTAGE RANGE	96-134Vrms	COMPLIES WITH NORMAL/ ABNORMAL INPUT VOLTAGES PER RTCA/DO-160E, SECTION 16
INPUT FREQUENCY RANGE	360Hz – 800Hz. Exceeds RTCA/DO-160E and Airbus ABD0100.1.8, issue D for power factor and input current harmonic distortion levels over the wide operating frequency range for ½ to full output loading	OPERATES AT 47 – 360Hz WITH REDUCED DISTORTION PERFORMANCE
LEAKAGE CURRENT	< 5mA	AC LINE/NEUTRAL TO CHASSIS, @ 115Vrms / 400Hz
INRUSH CURRENT	< 7.0Apk	COLD START
TOTAL HARMONIC DISTORTION (INPUT CURRENT)	< 3.5% < 5.0%	1/2 TO FULL OUTPUT LOAD (60W-120W), 360Hz 1/2 TO FULL OUTPUT LOAD (60W-120W), 800Hz
INDIVIDUAL HARMONICS, AC CLEAN, (Vthd < 1.25%)	EVEN: < 1% I _f / n, (n<10) EVEN: <0.1% I _f (n ≥10) ODD: < 30% I _f / n ODD TRIPLENS: < 15% I _f / n	360-800Hz I _f = FUNDAMENTAL CURRENT Vthd < 1.25%, n = 1 THRU 99, n = ORDER OF HARMONIC ½ TO FULL LOAD (60W-120W) DISREGARD HARMONIC CURRENTS < 5mA _{rms}
INDIVIDUAL HARMONICS, DISTORTED INPUT, (Vthd > 10%)	EVEN: < 1% I _f / n + V _n (n<10) EVEN: <0.1% I _f + V _n (n ≥10) ODD: < 30% I _f / n + V _n ODD TRIPLENS: < 15% I _f / n + V _n	360-800Hz Vthd ≥ 10%, n = 1 THRU 99, V _n = CORRESPONDING INPUT VOLTAGE HARMONIC n = ORDER OF HARMONIC ½ TO FULL LOAD (60W-120W) DISREGARD HARMONIC CURRENTS < 5mA _{rms}
POWER FACTOR	0.90 min	P _{out} > 50W
CREST FACTOR (CURRENT)	1.314 - 1.514	RATIO OF PEAK/ RMS
START-UP TIME	< 500mSec	OUTPUTS WITHIN REGULATION
CONDUCTED EMISSIONS	RTCA/DO-160E	CATEGORY M EQUIPMENT
STORAGE TEMPERATURE RANGE	-55°C TO +100°C	NON-OPERATIONAL
OPERATING TEMPERATURE RANGE	-25°C TO +70°C	REQUIRES EXTERNAL AIRFLOW TO ASSURE CASE TEMPERATURE DOES NOT EXCEED 100°C
OUTPUT ENABLE - H	TTL LEVEL, SECONDARY REFERENCED	DISABLES ALL OUTPUTS EXCEPT +28V and +24Vbattery WHEN ASSERTED LOW. REQUIRES 2.5V MIN LEVEL TO ENABLE SUPPLY OUTPUTS (NO INTERNAL PULL-UP PROVIDED). SHOULD BE PULLED HIGH THROUGH WITH A 33k - 68k RESISTOR ATTACHED TO 28V (CONTINUOUS) OUTPUT IF NOT USING OUTPUT ENABLE FUNCTION.

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OUTPUT CHARACTERISTICS

PARAMETER	70050M5-800	REMARKS
RATED OUTPUT POWER	120W	CONTINUOUS
RATED OUTPUT VOLTAGES		SEE "STANDARD OUTPUTS" TABLE
TEMPERATURE STABILITY COEF.	0.01% / °C	OUTPUT VOLTAGES
OUTPUT RIPPLE + NOISE (pk - pk)	< 1%	20MHz BANDWIDTH (EACH OUTPUT)
LINE REGULATION	< 0.5%	INDIVIDUAL OUTPUT DEVIATION FOR ± 20%, STEP CHANGE IN LINE VOLTAGE
LOAD REGULATION	OUTPUTS REMAIN WITHIN REGULATION	50% STEP CHANGE IN INDIVIDUAL OUTPUT LOAD
HOLD-UP TIME	50mSec MINIMUM	AT FULL 120W LOAD. REQUIRES EXTERNAL 250V RATED ELECTROLYTIC CAPACITORS CONNECTED TO P2, OR OPERATION FROM 24V BATTERY, FOR EXTENDING HOLD-UP TIME. CONTACT PPI ENGINEERING FOR MORE DETAIL.
ISOLATION VOLTAGE INPUT TO CHASSIS	1500Vac, 60Hz	NO ARCING OR DAMAGE FOR 60 SECOND TEST DURATION. LEAKAGE CURRENT < 10mArms.
ISOLATION VOLTAGE INPUT TO OUTPUT	1500Vac, 60Hz	NO ARCING OR DAMAGE FOR 60 SECOND TEST DURATION. LEAKAGE CURRENT < 10mArms.
OUTPUT VOLTAGE ADJUSTMENT	NONE	
EXTPWRFAIL-H STATUS LINE	HIGH STATE, 2.5Vmin 0.5Vmax @ 16mA SINK CURRENT LOW STATE,	LOW STATE (W/ RESPECT TO DC Return) UPON DETECTION OF INPUT AC > 96Vrms. ASSERTS HIGH WITHIN 10mSEC UPON DETECTION OF INPUT AC SOURCE FALLING BELOW 90Vrms

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BATTERY CHARGER CHARACTERISTICS

PARAMETER	70050M5-800	REMARKS
RATED OUTPUT VOLTAGE	29V	0.6A CONSTANT CURRENT SOURCE
FAST CHARGE CURRENT	0.6A TYPICAL	SEE "BATTERY OPERATION SUMMARY" FOR TERMINATION OF FAST CHARGING MODE
TRICKLE CHARGE CURRENT	10mA TYPICAL	CONTINUOUS WHEN NOT IN FAST CHARGE MODE OF OPERATION
BATTERY ENABLE – H SIGNAL	2.5V MINIMUM	APPLY A TTL HIGH (W/RESPECT TO DCrtn) TO ACTIVATE BATTERY CHARGER AND BATTERY CHARGER CONVERTER, A TTL LOW WILL DISABLE BATTERY CONVERTER IF OPERATING FROM BATTERIES
BATTERY LOW – H STATUS LINE	2.5 V MINIMUM	ACTIVE HIGH OUTPUT UPON DETECTION OF BATTERY VOLTAGE AT 22 V ± 0.5V
OFF STATE LEAKAGE CURRENT	< 30uA MAXIMUM	LEAKAGE CURRENT FROM BATTERY WHEN POWER SUPPLY IS IN OFF STATE

BATTERY OPERATION SUMMARY

When an external rechargeable +24Vdc Nickel Cadmium battery is connected to J2, and AC is applied to the power supply (at J1), and BATTERY ENABLE is asserted high with respect to DC Return, the internal battery charger will begin the FAST CHARGE mode of operation. Provided the battery is capable of taking a charge (i.e., the initial battery voltage is greater than 18V), the FAST CHARGE mode will commence and will continue for no less than 7 minutes. Once the initial 7 minute time period has timed out, the FAST CHARGE mode will be terminated if the battery voltage is sensed to be higher than 29.3V or 90 minutes elapses - whichever occurs first. The charger circuit will then enter the TRICKLE CHARGE mode which will occur continuously to keep the battery "topped off". If the AC input power is removed, the power supply will automatically switch over to battery operation. The five DC outputs are guaranteed to remain in regulation during the switchover time period. If the AC input voltage is reapplied, battery operation will cease and the charger circuit will re-establish the FAST CHARGE mode of operation. The charger circuit is disabled while operating from batteries.

The power supply will operate from battery voltage as long as this voltage is larger than 18V. If the battery voltage discharges below 18V, the supply will automatically shutdown and remain latched off. Only application of AC input power will clear this latching mechanism. The **70050M5-800** supply cannot start from battery voltage, only AC input power.