

AC420W-30V-PBF

(115Vac, 47-800Hz INPUT)

420W, 30.5V OUTPUT

AIRBORNE PFC POWER SUPPLY



Providing one isolated 30.5V output voltage and up to 420W continuous output power, the **AC420W-30V-PBF** is optimized for wide frequency RTCA/DO-160G airborne applications. Overall supply efficiency exceeds 87% at full rated output load. The **AC420W-30V-PBF** is capable of providing up to 420W output power during momentary input AC interrupts of 200mSec or more and employs an interleaved PFC converter to increase efficiency and spread out heat dissipation.

Weighing approximately 3.75lbs, the **AC420W-30V-PBF** is housed within a sheetmetal enclosure suitable for flush mounting within an upper unit level chassis. Outline dimensions are 7.1" x 6.9" and overall supply height is 3.3". Interconnection is accomplished using Zierick #836 spade terminals.

The **AC420W-30V-PBF** is designed and manufactured to stand-up to the harsh operating environments encountered in today's aircraft installations. Incorporating multiple layers of built-in protection features; including overcurrent, over-voltage and overtemperature; safe and reliable operation is assured for each and every application.



FEATURES

	One isolated output: +30.5V
	Meets RTCA/DO-160G, section 16, for power factor and input current harmonic distortion levels over the wide frequency operating range (360Hz – 800Hz)
	Complies with RTCA/DO-160G for conducted emissions, susceptibility and power input (sect 16), see note 2 next sheet
	Efficiency: > 87% at full rated load
	Wide input range: 96 – 134Vac, 47-800Hz
	Active inrush current limiting: 13Apk
	Size: 7.1" x 6.9" x 3.1"; Weight: less than 60 ounces
	Independent over-current and over-voltage protection main output
	PFC output overvoltage protection (internal 356Vdc PFC output)
	Over-temperature protection (110°C frame temp)

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STANDARD 30.5V OUTPUT TABLE

PARAMETER	OUTPUT VOLTAGE	NOTES
Voltage Regulation	+30.5V \pm 1%	
Output Current	13.8A	3
Full Load	420W	3
Minimum Load	0A	
Pk-pk Ripple + Noise (20MHz)	305mVpp max	4
Overcurrent Fault Level	15A typ, 18A max	1

Notes:

1. Maximum, foldback current limited using pulse retry circuitry. Output will auto-recover into full load once fault clears
2. Requires external filter installed on power lines for full compliance; contact PPI engineering for details
3. Attaching supply frame to external metal and/ or forced air cooling is required when operating at full load
4. Measured with bayonet grounding and 20MHz BW

APPLICABLE SPECIFICATIONS

	RTCA/DO-160G, section 4, altitude/ temperature (operating) to 15,000 feet, category A1 equipment
	RTCA/DO-160G, section 6, humidity (operating) category A
	RTCA/DO-160G, section 7, shock (operating) category S, curve C
	RTCA/DO-160G, section 8, vibration (operating) category S, curve C
	RTCA/DO-160G, section 15, magnetic effect, category B
	RTCA/DO-160G, section 16, power input requirements for 115V - AC input, category A(WF) equipment
	RTCA/DO-160G, section 17, voltage spike, category B equipment
	RTCA/DO-160G, section 18, conducted susceptibility, category Z equipment
	RTCA/DO-160G, section 19, induced signal susceptibility, category Z equipment
	RTCA/DO-160G, section 20, conducted and radiated susceptibility, category T equipment
	RTCA/DO-160G, section 21, conducted and radiated emissions, category M equipment, with external power line EMI filter
	Operating temperature: -25°C to +70°C, forced air and/ or external heatsinking is required
	Storage temperature: -25°C to +70°C



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INTERCONNECTION

Zierick #836 Spade Terminals	
REF DES	SIGNAL
P1	LINE
P2	NEUTRAL
P4, P5	+30.5Vrtn
P6, P7	30.5Vout
Molex 197084013 Spade Terminal	
REF DES	SIGNAL
P3	ACPF-L



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ELECTRICAL SPECIFICATIONS

Unless otherwise specified the following test conditions apply: Ta = 25°C, constant active load applied to output.
Vin = 115Vrms, 360Hz–800Hz, <1.25% sinusoid.

INPUT CHARACTERISTICS

PARAMETER	AC420W-30V-PBF	REMARKS	NOTES
INPUT VOLTAGE RANGE	96-134Vrms	Complies with normal / abnormal input voltages per DO-160G, sect 16	2
MUST START VOLTAGE	96Vrms minimum	Supply will start and remained enabled for input voltage in the range of 96Vrms < Vin < 134Vrms	2
INPUT FREQUENCY RANGE	47 – 800Hz	Reduced distortion performance below 360Hz	2
EFFICIENCY (FULL LOAD)	87.9% typical at 115Vrms input 86% min at 115Vrms input	Full rated load (420W)	2
EFFICIENCY (75% LOAD)	87.7% typical at 115Vrms input 86% min at 115Vrms input	75% rated load (315W)	2
LEAKAGE CURRENT	< 5mArms	AC line / neutral to chassis at 115Vrms / 400Hz.	1
INRUSH CURRENT	< 12.3Apk typical, 19.6Apk max	Cold start	2
START-UP TIME	< 1.35 Sec typical, 1.80 Sec max	Output within proper regulation	2
INDIVIDUAL HARMONICS AC CLEAN	EVEN: <1% If / n (n < 10) EVEN: <0.1%If (n ≥ 10) ODD: <30% If / n ODD TRIPLENS:<15% If / n	If = fundamental current Vthd < 1.25% n = order of harmonic (1 - 99) > 315W output load, with ext filter Harmonics < 10mA disregarded	1
INDIVIDUAL HARMONICS DISTORTED INPUT	EVEN: <1% If / n + 1.25Vn (n < 10) EVEN: <0.1%If + 1.25Vn (n ≥ 10) ODD: <30% If / n + 1.25Vn ODD TRIPLENS:<15% If / n+1.25Vn	If = fundamental current Vthd > 10% (clipped method), n = order of harmonic (1 - 99) Vn = corr input voltage harmonic. > 315W output load, with ext filter Harmonics < 10mA disregarded	1
CONDUCTED EMISSIONS	RTCA/DO-160G	Section 21, category M	1, 3
QUIESCENT POWER	5W typical	Pout = 0W	2



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INPUT CHARACTERISTICS (Cont)

PARAMETER	AC420W-30V-PBF	REMARKS	NOTES
STORAGE TEMP RANGE	-25°C TO +70°C	Non operational	1
OPERATING TEMP RANGE	-25°C TO +70°C	Requires external airflow or heatsink to assure case temperature does not exceed 110°C	1
OVERTEMPERATURE SHUTDOWN	110°C +/- 5°C	Supply is inhibited at or above 110°C, auto re-start at ~ 90°C case temperature	1

Notes:

1. Ensured by design and/ or verified during DVT, not 100% tested in production
2. 100% tested for specification compliance in production
3. Requires external filter (differential and common mode) installed on power lines for full compliance, contact PPI Engineering for details
4. Attaching supply frame to external metal and/ or forced air cooling is required when operating at full load



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OUTPUT CHARACTERISTICS

PARAMETER	AC420W-30V-PBF	REMARKS	NOTES
RATED OUTPUT POWER	420W	Continuous	2, 4
MAXIMUM OUTPUT CAPACITANCE	2000uF	Applied to 30.5V output	1
OUTPUT VOLTAGE TOLERANCE	30.5V \pm 1%	No load to full load, See "STANDARD 30.5V OUTPUT" table	2
OUTPUT OVERCURRENT THRESHOLD	15A (typical) 18A (maximum)	Foldback current limited with auto-recovery into full load once fault clears. Employs pulse-retry operation into shorted output. No damage will occur to supply during indefinite output short circuit conditions	2
TEMPERATURE STABILITY COEFFICIENT	0.05% / °C	Output voltage variation with temperature (500uV / °C)	1
OUTPUT RIPPLE + NOISE (pk-pk)	< 305mVpp (maximum)	20MHz Bandwidth	2
MINIMUM OUTPUT LOAD	0A	No output load required for supply stability or proper output regulation	2
LINE REGULATION	< 0.1%	Output deviation for \pm 20% step change in input voltage	1
LOAD REGULATION (TRANSIENT LOAD RECOVERY)	+/- 600mVpk (typical) <200mSec recovery (typical)	50% step change in output load. Full load to half load or half load to full load. 10uSec rise/fall time	2
HOLD-UP TIME	200mSec (min) @ Pout = 420W	Output ride through during momentary loss of input power, assured by design and DVT	1
HOLD-UP TIME	200mSec (min) @ Pout = 315W	Output ride through during momentary loss of input power, assured by test in ATP	2
ACPF-L	Asserts logic level low (<0.5Vdc) with respect to 30.5Vrtn within 16mSec upon loss of input AC . Logic high level is between 3.2V and 3.4V	Secondary referenced status signal concerning state of input AC	2
ISOLATION VOLTAGE INPUT TO CHASSIS	1000Vac	No arcing or damage for 60-second test duration (7mArms max leakage)	2
ISOLATION VOLTAGE INPUT TO OUTPUT	1000Vac	No arcing or damage for 60-second test duration (7mArms max leakage)	2
INSULATION RESISTANCE OUTPUT TO CHASSIS	>500Mohm at 500Vdc	No arcing or damage for 60-second test duration (1uAdc maximum)	1



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OUTPUT CHARACTERISTICS (Cont)

PARAMETER	AC420W-30V-PBF	REMARKS	NOTES
OUTPUT OVERVOLTAGE PROTECTION (initial inner loop, non-latching)	+30.5V output limited to 120% of maximum output set point	Pulse-by-pulse protection, 4mSec fault to activation delay, auto-restart once fault condition clears	1
OUTPUT OVERVOLTAGE PROTECTION (independent secondary protection, non-latching)	+30.5V output limited to 135% of maximum output set point	Independent OVP protection circuitry will engage in the event "soft" OVP fails to operate, auto-restart once fault condition clears	1
PFC 356Vdc OUTPUT OVERVOLTAGE PROTECTION (non-latching)	392V maximum	PFC converter is disabled upon detection of 356Vdc PFC bus measuring > 385Vdc. PFC controller will automatically re-enable and enter controlled recovery once fault condition clears	1

Notes:

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4. Attaching supply frame to external metal and/ or forced air cooling is required when operating at full load

