(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, overvoltage and overtemperature; safe and reliable operation is assured for each and every application.



#### **FEATURES**

| _ | One isolated output: +30.5V   |
|---|---|
| 1 | Meets RTCA/DO-160G, section 16, for power factor and input current harmonic distortion levels over the wide frequency operating range (360Hz – 800Hz) |
| 1 | Complies with RTCA/DO-160G for conducted emissions, susceptibility and power input (sect 16), see note 2 next sheet                                   |
| 1 | Efficiency: > 87% at full rated load  |
| 1 | Wide input range: 96 – 134Vac, 47-800Hz   |
| 1 | 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)  |
| 1 | Over-temperature protection (110°C frame temp)  |



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#### **STANDARD 30.5V OUTPUT TABLE**

| PARAMETER                    | OUTPUT VOLTAGE   | NOTES |
|------------------------------|------------------|-------|
| Voltage Regulation           | +30.5V ± 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    |  |
| Р3                             | ACPF-L    |  |



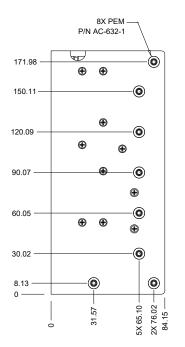
(115Vac, 47-800Hz INPUT)

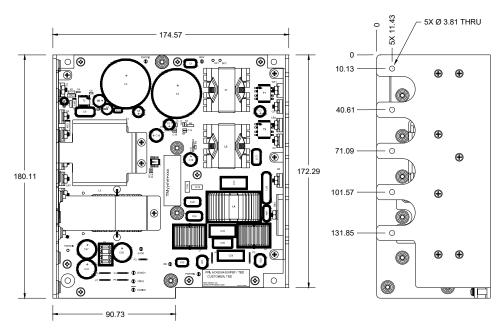
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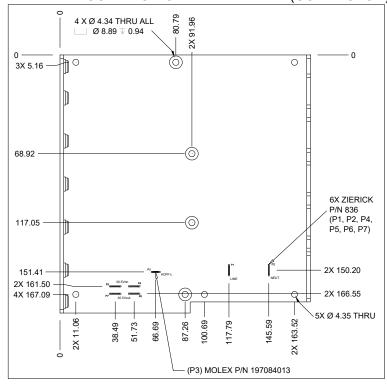
#### **MECHANICAL DIAGRAM**

#### ALL DIMENSIONS ARE IN mm





#### DETAIL DIMS MOUNTING HOLES AND SPADE (CONNECTOR)



NOTE: DETAILED MECHANICAL AND SOLID WORKS DRAWING AVAILABLE UPON REQUEST



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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<br>86% min at 115Vrms input   | Full rated load (420W)  | 2     |
| EFFICIENCY (75% LOAD)                | 87.7% typical at 115Vrms input<br>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<br>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)<br>EVEN: <0.1%If + 1.25Vn (n > 10)<br>ODD: <30% If / n + 1.25Vn<br>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<br>SHUTDOWN | 110°C +/- 5°C  | Supply is inhibited at or above 110°C, auto restart 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<br>CAPACITANCE                | 2000uF  | Applied to 30.5V output   | 1     |
| OUTPUT VOLTAGE<br>TOLERANCE                  | 30.5V ± 1%  | No load to full load,<br>See "STANDARD 30.5V OUTPUT" table  | 2     |
| OUTPUT OVERCURRENT<br>THRESHOLD              | 15A (typical)<br>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<br>(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 ± 20% step change in input voltage   | 1     |
| LOAD REGULATION<br>(TRANSIENT LOAD RECOVERY) | +/- 600mVpk (typical)<br><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<br>PROTECTION (independent<br>secondary protection, non-<br>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<br>OVERVOLTAGE PROTECTION<br>(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:

- 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

