AC500W-48V-PBF

(115Vac, 47-800Hz INPUT)

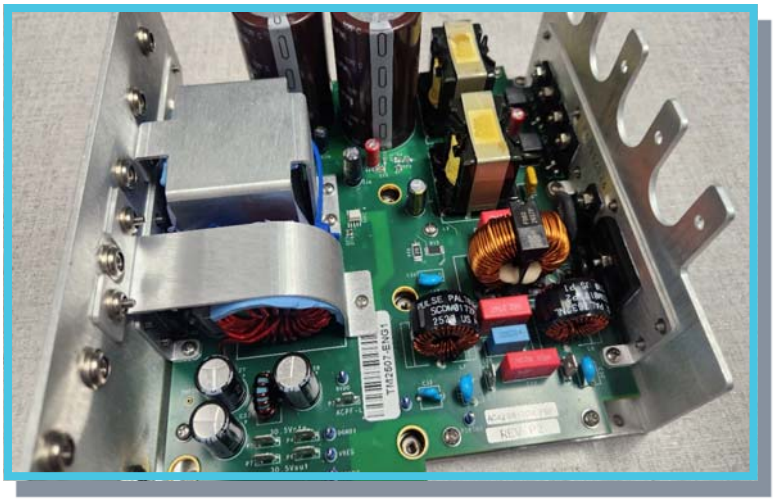
500W, 49V OUTPUT

AIRBORNE PFC POWER SUPPLY

Providing one isolated 49V output voltage and up to 500W continuous output power, the **AC500W-48V-PBF** is optimized for wide frequency RTCA/DO-160G airborne applications. Overall supply efficiency exceeds 87% at full rated output load. The **AC500W-48V-PBF** is capable of providing up to 500W 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 4lbs, the **AC500W-48V-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 3.6". Interconnection is accomplished using Zierick #836 spade terminals.

The **AC500W-48V-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: +49.4V
	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, nominal 115Vac line
	Wide input range: 96 – 134Vac, 47-800Hz
	Active inrush current limiting: 10Apk - typical
	Size: 7.1" x 6.9" x 3.6"; Weight: less than 64 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)
	MTBF: 303,951 Hours, RIAC 217Plus, Aic category, 55°C ambient temp, 65%DC, 2190 Cycles/ year

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STANDARD 49V OUTPUT TABLE

PARAMETER	OUTPUT VOLTAGE	NOTES
Voltage Regulation	+49.4V ± 2%	
Output Current	10.2A	3
Full Load	500W	3
Minimum Load	5W	5
Pk-pk Ripple + Noise (20MHz)	305mVpp max	4
Overcurrent Fault Level	12A typ, 18A max	1

Notes:

1. **Maximum, foldback current limited using pulse retry circuitry. Output will auto-recover into full load once fault clears. Supply can provide up to 20A pulsed load for >250uSec without evoking overcurrent protection circuit**
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**
5. **Minimum load is required in order to keep output within 2% regulation band. No load is required for supply safety however output may pulsate above and below 2% regulation band when output is loaded <5W**

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

INTERCONNECTION

Zierick #836 Spade Terminals	
REF DES	**SIGNAL**
P1	LINE
P2	NEUTRAL
P4, P5	+49Vrtn
P6, P7	49Vout
Molex 197084013 Spade Terminal	
REF DES	**SIGNAL**
P3	ACPF-L

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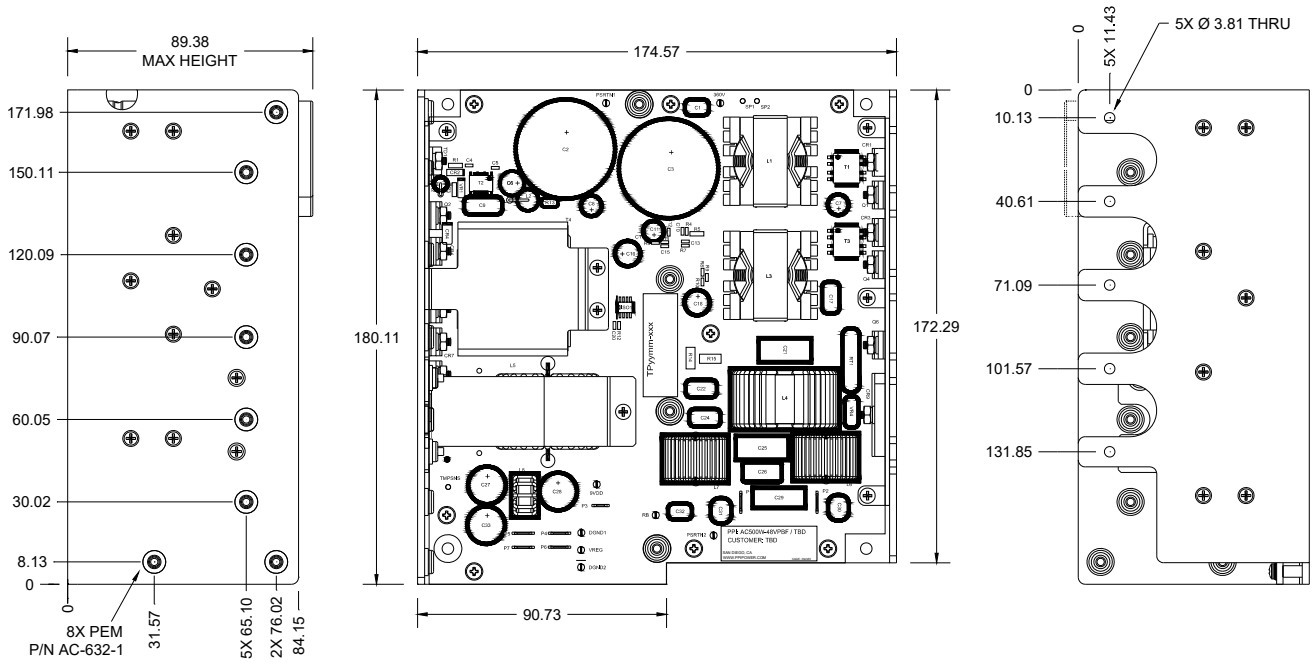
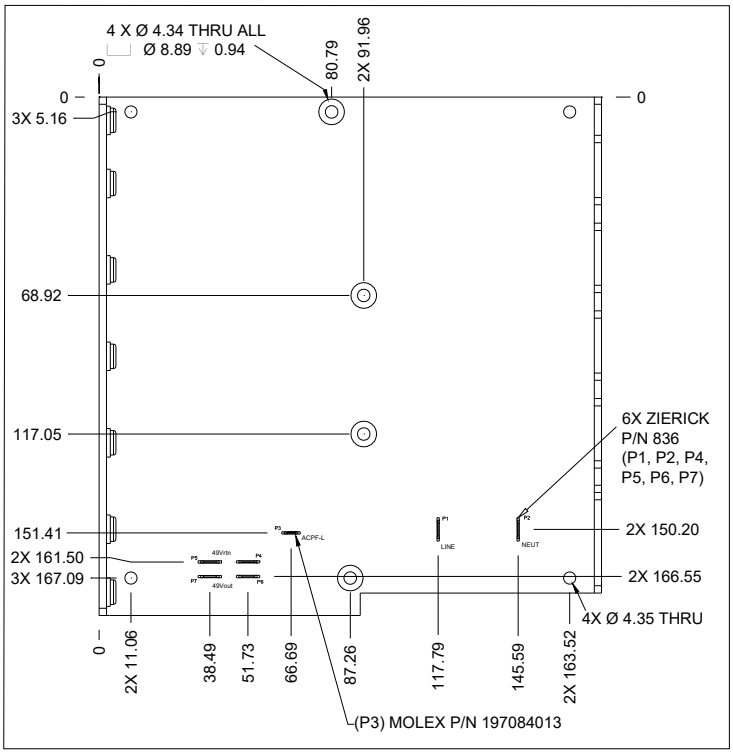
MECHANICAL DIAGRAM

ALL DIMENSIONS ARE IN mm



DETAIL DIMS MOUNTING HOLES AND SPADE (CONNECTOR)



NOTE: DETAILED MECHANICAL AND SOLID WORKS DRAWING AVAILABLE UPON REQUEST

lead-free

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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	*AC500W-48V-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)	**88% typical at 115Vrms input 86% min at 115Vrms input**	**Full rated load (500W)**	**2**
EFFICIENCY (75% LOAD)	**87.8% typical at 115Vrms input 86% min at 115Vrms input**	**75% rated load (375W)**	**2**
LEAKAGE CURRENT	**< 5mArms**	**AC line / neutral to chassis at 115Vrms / 400Hz.**	**1**
INRUSH CURRENT	**< 10Apk 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) > 375W 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. > 375W output load, with ext filter Harmonics < 10mA disregarded**	**1**
CONDUCTED EMISSIONS	**RTCA/DO-160G**	**Section 21, category M**	**1, 3**
QUIESCENT POWER	**11.6W typical**	**Pout = 5W**	**2**

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INPUT CHARACTERISTICS (Cont)

PARAMETER	*AC500W-48V-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, 5
OVERTEMPERATURE 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
5. Supply can safely operate at –40°C but will take several minutes run time to self heat and comply with regulation and ripple specifications
6. Supply can provide up to 20A pulsed load for >250uSec without evoking overcurrent protection circuit

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PPI POWER

OUTPUT CHARACTERISTICS

PARAMETER	*AC500W-48V-PBF*	*REMARKS*	*NOTES*
RATED OUTPUT POWER	500W	Continuous	2, 4
MAXIMUM OUTPUT CAPACITANCE	470uF	Applied to 49V output	1
OUTPUT VOLTAGE TOLERANCE	49.4V ± 2%	5W to full load, See "STANDARD 49V OUTPUT" table	2
OUTPUT OVERCURRENT THRESHOLD	12A (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, 6
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	100mA	5W load required for proper output regulation. Supply can safely operate into no load however 2% reg window will not be achieved at no load	2
LINE REGULATION	< 0.1%	Output deviation for ± 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 = 500W	Output ride through during momentary loss of input power	2
ACPF-L	Asserts logic level low (<0.5Vdc) with respect to 49Vrtn 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

Pb lead-free

OUTPUT CHARACTERISTICS (Cont)

PARAMETER	*AC500W-48V-PBF*	*REMARKS*	*NOTES*
OUTPUT OVERVOLTAGE PROTECTION (initial inner loop, non-latching)	+49V output limited to 110% 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)	+49V output limited to 125% 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:

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
5. Supply can safely operate at –40°C but will take several minutes run time to self heat and comply with regulation and ripple specifications
6. Supply can provide up to 20A pulsed load for >250uSec without evoking overcurrent protection circuit