

70170AC-1

(115Vac, 47- 800Hz Input)

170W, 28V Single Output,
Airborne PFC Power Supply



Targeting Point-of-Load (POL) applications, the **70170AC-1** provides a single 28Vdc output at up to 6A continuous output current. It meets the most stringent airborne requirements including those for variable frequency 115Vac generator systems over the wide frequency range of 360-800Hz and RTCA/DO-160D category M emissions. Efficiency exceeds 80% at ½ to full output load helping to keep internal heat dissipation to a minimum. The **70170AC-1** is capable of providing uninterrupted ride-through at full output load during momentary input AC brown-out conditions for up to 200mSec. Standard protection features are built-in in to assure years of fault-tolerant and reliable operation in the harshest environments.

Weighing less than 36 ounces, the **70170AC-1** is housed in an aluminum enclosure with outer dimensions of 8.0" x 4.75" x 1.4". The top cover is perforated; the lower U-Chassis accepts five #4 screws to facilitate system mounting. Interconnection is accomplished using a single Samtec right angle connector.

A second supply configuration is available, the **70170AC-2**, that meets all of these same requirements except the output is scaled down to provide a maximum output current of 3.6A (100W output power). This configuration provides greater than 330mSec uninterrupted ride through and complies with all of the same standards, including the wide frequency distortion requirements, over the output power range of 50W to 100W. Please contact PPI's sales department for further information on this supply configuration.



FEATURES

	Meets both RTCA/DO-160D, section 16, notice 2 and Airbus ABD0100.1.8 issue D for power factor and input current harmonic distortion levels over the wide frequency operating range (360Hz – 800Hz)
	Efficiency: 80% minimum: ½ to full rated output load, all input (line) conditions
	Wide input range: 97Vrms – 134Vrms, 47 – 800Hz
	Complies with RTCA/DO-160D for conducted emissions, susceptibility and power input (section 16)
	Active inrush current limiting: 7Apk typical, 12Apk maximum
	Size: 8.0" x 4.75" x 1.4", weight: less than 32 ounces
	Single output: 28Vdc at up to 170W output power
	Overcurrent protection with foldback limiting
	Three layers of 28Vdc output overvoltage protection
	PFC output overvoltage protection with automatic restart (internal 360Vdc PFC output)
	Over-temperature shutdown with automatic restart (at or above 100°C)
	Under-temperature inhibit (at or below -20°C)
	AC status line (TTL)
	Output enable line (TTL)
	MTBF: 25,000 Hours, Aic category, 30°C case temperature (MIL-HDBK-217F)

70170AC-1

(115Vac, 47- 800Hz Input)

170W, 28V Single Output,
Airborne PFC Power Supply



PERFORMANCE SUMMARY

PARAMETER	VALUE (TYPICAL)
Voltage regulation	+28Vdc +/-2%
Output current	6A
Minimum load	60mA
Pk-Pk Ripple + Noise (20MHz)	30mVpp
Efficiency	84%
Output ride-through / full load	200mSec
Output overcurrent threshold (1)	6.7A
Output overvoltage trip-point "soft" protection	30.4V
Output overvoltage trip-point "hard" protection	34.9V
Output overvoltage "crowbar" activation set point	38.0V
PFC output overvoltage trip-point	420V
MTBF (Aic, 30°C case)	25,000 Hours

Notes:

1. Foldback current limited. Output will recover into full 6A load automatically when overcurrent fault condition clears.















70170AC-1

(115Vac, 47- 800Hz Input)

170W, 28V Single Output,
Airborne PFC Power Supply



SPECIFICATIONS

	RTCA/DO-160D, Section 4, Temperature, category A1 equipment, -15°C to 70°C operating
	RTCA/DO-160D, Section 4, Category A1 equipment, Altitude: 15,000 feet, Decompression: 55,000 feet, Overpressure: 170kPa
	RTCA/DO-160D, Section 5, Temperature variation, category C
	RTCA/DO-160D, Section 6, Humidity (operating) category A
	RTCA/DO-160D, Section 7, Shock (operating) category B
	RTCA/DO-160D, Section 8, Vibration (operating) category S, curve B
	RTCA/DO-160D, Section 15, Magnetic effect, category Z
	RTCA/DO-160D, Section 16, Change notice 2, Power input requirements for category A(WF) equipment
	RTCA/DO-160D, Section 17, Voltage spike, category A
	RTCA/DO-160D, Section 18, Audio frequency conducted susceptibility, category A(WF) equipment
	RTCA/DO-160D, Section 19, Induced signal susceptibility, category Z
	RTCA/DO-160D, Section 20, Conducted and radiated susceptibility, category T, R
	RTCA/DO-160D, Section 21, Conducted and radiated emissions, category M
	RTCA/DO-160D, Section 25, Electrostatic discharge, category A

70170AC-1

(115Vac, 47- 800Hz Input)

170W, 28V Single Output,
Airborne PFC Power Supply

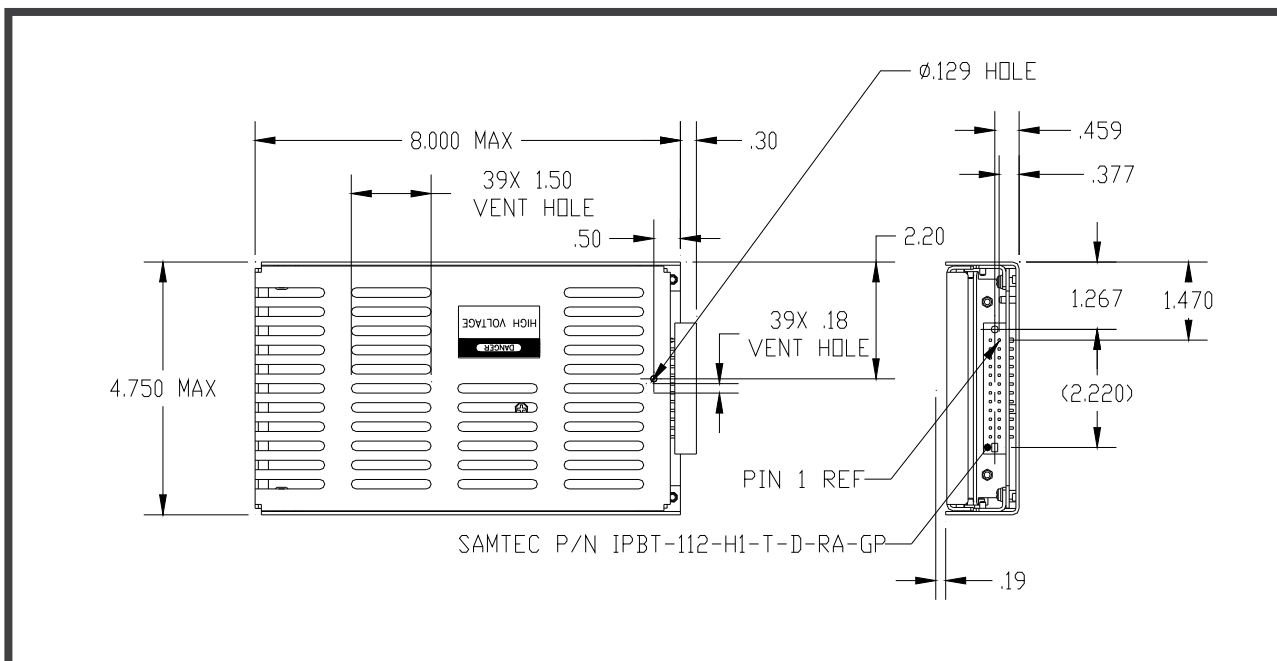


INTERCONNECTION

Interconnection is accomplished with a single Samtec IPBT-112-H1-T-D-RA-GP. Pin-outs are shown below. Use Samtec PMSD or PMSS series mating connector.

Pin	Signal	Pin	Signal	Pin	Signal
1	+28Vout	9	NC	17	28V Current Sense
2	DCRTN	10	NC	18	NC
3	DCRTN	11	Chassis	19	NC
4	ACPWRFAIL-L	12	NC	20	NC
5	NC	13	+28Vout	21	NC
6	NC	14	DCRTN	22	AC Neutral
7	NC	15	OUTPUTEN-L	23	NC
8	NC	16	DCPWRGOOD-L	24	AC Line

MECHANICAL DIAGRAM



A DETAILED OUTLINE DRAWING FURNISHED UPON REQUEST

70170AC-1

(115Vac, 47- 800Hz Input)

170W, 28V Single Output,
Airborne PFC Power Supply



ELECTRICAL SPECIFICATIONS

Unless otherwise specified the following test conditions apply: $T_a = 25^{\circ}\text{C}$, constant active load applied to output, $V_{in} = 115\text{Vrms}$, 360Hz to 800Hz, <1.25% sinusoid.

INPUT CHARACTERISTICS

PARAMETER	70170AC-1	REMARKS	NOTES
INPUT VOLTAGE RANGE	97 – 134Vrms	Complies with normal / abnormal input voltages per DO-160D, section 16	2
INPUT UNDERVOLTAGE DISABLE	97Vrms minimum	Supply will start and remained enabled for input voltage in the range of $97\text{Vrms} < V_{in} < 134\text{Vrms}$. Supply will shutdown for sustained input undervoltages.	2
INPUT FREQUENCY RANGE	47 – 800Hz	Reduced distortion performance below 360Hz	2
EFFICIENCY	80% minimum	50% to 100% Output Load (85W to 170W); 84% typical	2
LEAKAGE CURRENT	< 5mArms	AC Line / Neutral to Chassis at 115Vrms / 400Hz	1
INRUSH CURRENT	<12.2Apk maximum	Cold or Warm Start; 7Apk typical	2
TOTAL HARMONIC DISTORTION (INPUT CURRENT)	< 3.5%	50% to 100% Output Load (85W to 170W)	2
INDIVIDUAL HARMONICS AC CLEAN	EVEN: <1% I_f / n ($n < 10$) EVEN: <0.1% I_f ($n \geq 10$) ODD: <30% I_f / n ODD TRIPLENS:<15% I_f / n	I_f = Fundamental Current $V_{thd} < 1.25\%$, $n=1$ through 99 n = order of harmonic 50% to 100% Load (85W to 170W)	1
INDIVIDUAL HARMONICS DISTORTED INPUT	EVEN: <1% $I_f / n + V_n$ ($n < 10$) EVEN: <0.1% $I_f + V_n$ ($n \geq 10$) ODD: <30% $I_f / n + V_n$ ODD TRIPLENS:<15% $I_f / n + V_n$	I_f = Fundamental Current $V_{thd} > 5\%$, $n=1$ through 99 V_n = corresponding voltage harmonic 50% to 100% Load (85W to 170W)	1
POWER FACTOR	0.90 min	$P_{out} > 50\text{W}$, 360 – 800Hz	2
CREST FACTOR (CURRENT)	1.314 – 1.514	Ratio of Peak / RMS	1
START-UP TIME	< 500mSec	Outputs within regulation	2
CONDUCTED EMISSIONS	RTCA/DO-160D	Category M	1
STORAGE TEMPERATURE RANGE	-55°C to +100°C	Non-operational	1
OPERATING TEMPERATURE RANGE	-15°C to +70°C	Supply in inhibited at or below -20°C Auto Restart	1

70170AC-1

(115Vac, 47- 800Hz Input)

170W, 28V Single Output,
Airborne PFC Power Supply



INPUT CHARACTERISTICS—CONTINUED

PARAMETER	70170AC-1	REMARKS	NOTES
OUTPUT ENABLE SIGNAL - L	TTL active LOW signal; requires a TTL HIGH (> 5mA drive current) to disable supply	Secondary referenced; supply will disable within 1 second of asserting high level logic state	1
OVERTEMPERATURE SHUTDOWN	100°C +/- 4°C	Supply is inhibited at or above 100°C Auto Restart at ~ 80°C case temp	1

Notes:

1. Ensured by design, not 100% tested in production.
2. 100% tested for specification compliance in production.

OUTPUT CHARACTERISTICS

PARAMETER	70170AC-1	REMARKS	NOTES
RATED OUTPUT POWER	170W	Continuous	2
OUTPUT VOLTAGE	28Vdc +/- 2% typical, 28Vdc +/-5% maximum		2
OUTPUT OVERCURRENT THRESHOLD	6.7A typical, 7.2A maximum	Output voltage will foldback, auto-recovery	2
TEMPERATURE STABILITY COEFFICIENT	0.01% / °C	Output voltage variation with temperature	1
OUTPUT RIPPLE + NOISE	150mVpp	150mVpp maximum; 30mVpp typical. 20MHz bandwidth	2
LINE REGULATION	<0.5%	28V output deviation for +/- 20% step change in input voltage	1
LOAD REGULATION	Output Remains in Regulation	50% step change in output load	1
MINIMUM LOAD	60mA	60mA minimum for proper output regulation. Can safely unload the output – supply may not regulate within -5% limit when output is unloaded at high line	2
HOLD-UP TIME	200mSec minimum	Full output load	2
ISOLATION VOLTAGE INPUT TO CHASSIS	1500Vac, 60Hz	No arcing or damage for 60-second test duration (8mAmrs max leakage)	1
ISOLATION VOLTAGE INPUT TO OUTPUT	1500Vac, 60Hz	No arcing or damage for 60-second test duration (8mAmrs max leakage)	1
RATED OUTPUT POWER	170W	Continuous	2
OUTPUT VOLTAGE	28Vdc +/- 2% typical, 28Vdc +/-5% maximum		2

70170AC-1

(115Vac, 47- 800Hz Input)

170W, 28V Single Output,
Airborne PFC Power Supply



OUTPUT CHARACTERISTICS—CONTINUED

PARAMETER	70170AC-1	REMARKS	NOTES
OUTPUT OVERCURRENT THRESHOLD	6.7A typical, 7.2A maximum	Output voltage will foldback, auto-recovery	2
TEMPERATURE STABILITY COEFFICIENT	0.01% / °C	Output voltage variation with temperature	1
OUTPUT RIPPLE + NOISE	150mVpp	150mVpp maximum; 30mVpp typical. 20MHz bandwidth	2
LINE REGULATION	<0.5%	28V output deviation for +/- 20% step change in input voltage	1
LOAD REGULATION	Output Remains in Regulation	50% step change in output load	1
MINIMUM LOAD	60mA	60mA minimum for proper output regulation. Can safely unload the output – supply may not regulate within -5% limit when output is unloaded at high line	2
HOLD-UP TIME	200mSec minimum	Full output load	2
ISOLATION VOLTAGE INPUT TO CHASSIS	1500Vac, 60Hz	No arcing or damage for 60-second test duration (8mAmrs max leakage)	1
ISOLATION VOLTAGE INPUT TO OUTPUT	1500Vac, 60Hz	No arcing or damage for 60-second test duration (8mAmrs max leakage)	1
ISOLATION VOLTAGE OUTPUT TO CHASSIS	250Vdc	No arcing or damage for 60-second test duration (100Mohm min)	1
DCPWRGOOD-L	0.5V maximum when output is within proper regulation	TTL Level, 16mA max sink current	2
ACPWRFAIL-L	Transitions to 0.5V max within 10mSec upon loss of input AC	Secondary referenced, TTL Level, 16mA max sink current	2
28V CURRENT SENSE	500mV +/-10% per Amp	Valid for all Iout > 0.5A	1
OUTPUT OVERVOLTAGE PROTECTION (SOFT)	30.4V set-point	Pulse by pulse protection (inner loop), auto-restart	1
OUTPUT OVERVOLTAGE PROTECTION (HARD)	34.9V set-point	Supply enters low duty cycle operation as long as fault condition persists, auto-restart	1
OUTPUT OVERVOLTAGE PROTECTION (CROWBAR)	38.0V set-point	Output is clamped to this level if soft and hard OVP circuits fail to limit output voltage.	1
OUTPUT VOLTAGE ADJUSTMENT	None		

Notes:

1. Ensured by design, not 100% tested in production.
2. 100% tested for specification compliance in production.

To inquire about price, delivery and supply options information please contact PPI sales department.