

## Product Specification

Universal AC Input with PFC  
DC Versions Available

## Key Product Features

- Up to 650 W
- 6U x 8HP
- Environmentally Rugged/  
Conformal Coating
- High Current 3.3V and 5V Outputs
- Ruggedized for enhanced Shock  
& Vibration
- Active Current Sharing
- Internal Oring FETs for redundant  
applications
- PICMG 2.11 Compliant

## Safety and EMC

- UL/cUL 60950-1, IEC/EN60950-1  
Approved
- EN55022 Level A Emissions

## Applications

- Ship Board, Ground Based, and  
Airborne

# CPCI-6U-R (Ruggedized) COTS Series

Up to 650 Watt Military Grade Compact PCI  
Power Supply for Harsh Environment and Military  
Applications



## Description

The CPCI 6U Series of power supplies offer industry leading performance with up to 650 Watts in a 6U package. A full range of AC and DC Input products are available and all products are compliant to the PICMG 2.11 power interface specification. These CPCI products are ruggedized and excel in defense and harsh environment applications.

## Ratings

Input Voltage Range—AC Input	90-264 VAC, 47-63Hz
Operating Temperature Range Current	-5°C to +55°C Full Power with 250 LFM
Sharing Accuracy (V1 and V2)	10% Sharing – up to 6 units

## Model Selection

Model	Input	Output Power	V1 Output	V2 Output	V3 Output	V4 Output
CPCI-AC-6U-400R	90-264VAC	400W	+5V/50A	+3.3V/80A	+12V/7.5A	-12V/1.5A
CPCI-AC-6U-500R	90-264VAC	500W	+5V/65A	+3.3V/80A	+12V/12A	-12V/1.5A
CPCI-AC-6U-600R	90-264VAC	600W	+5V/70A	+3.3V/70A	+12V/7A	-12V/1.5A
CPCI-AC-6U-650R	90-264VAC	650W	+5V/80A	+3.3V/70A	+12V/7A	-12V/1.5A
CPCI-DC-6U-350/24R	18-36VDC	350W	+5V/50A	+3.3V/60A	+12V/7A	-12V/1.5A
CPCI-DC-6U-400/24R	20-36VDC	400W	+5V/50A	+3.3V/60A	+12V/7A	-12V/1.5A
CPCI-DC-6U-400/48R	36-72VDC	400W	+5V/50A	+3.3V/80A	+12V/7.5A	-12V/1.5A
CPCI-DC-6U-500/48R	36-72VDC	500W	+5V/65A	+3.3V/80A	+12V/12A	-12V/1.5A
CPCI-DC-6U-600/48R	36-72VDC	600W	+5V/70A	+3.3V/70A	+12V/7A	-12V/1.5A
CPCI-DC-6U-650/48R	36-72VDC	650W	+5V/80A	+3.3V/70A	+12V/7A	-12V/1.5A

## Electrical Specifications

### Input

Input Voltage	90–264 VAC, 47–63 Hz, auto range, single phase according to MIL-STD-1399 section 300B type I
Inrush Current	14A maximum at 115 VAC for period of maximum 20mSec
Power Factor	1.98 typical at 230 VAC, full load ; 1.99 typical at 115 VAC, full load
Efficiency	>80% at 115 VAC and full load
Total Harmonic Distortion	<5%
Third Harmonic Distortion	<3%
Brown-Out	70 to 300 VAC for 50mSec

### Output Voltages and Currents

Output	Output Voltage	Tolerance	Output Current	Peak Load
V1	+5V	+5%/-3%	0 to 50A	55A
V2	+3.3V	+5%/-3%	0 to 60A	66A
V3	+12V	+5%/-5%	0 to 7.5A	8.5A
V4	-12V	+5%/-5%	0 to 4A	4A

Note: Maximum output power at any combination within this table is 400W

Maximum Output Power	400W with 250LFM forced air cooling, 250W with 150LFM forced air cooling and 100W free convection
Line Regulation	<0.5%
Load Regulation	±2% Maximum
Ripple & Noise	20MHz bandwidth measured across 1uF ceramic and 10uF electrolytic, capacitor paralleled
V1, V2	50mV p-p
V3, V4	100mV p-p
Overload & Short Circuit Protection	Fully protected against output overload and short circuit
V1, V2	110 to 130% off I Max, constant current limit, <b>recycle AC input power to reset</b>
V3, V4	110 to 200% off I Max, constant current limit, automatic recovery
V1,V2 Set Point Tolerance	±1%
Overshoot & Undershoot	0% at turn ON
Turn-On Rise Time	20mSec Max
Turn-On Rise Time by Inhibit	50mSec Max
Turn-On Delay from AC IN	1 Sec Max time required for initial output voltage stabilization
Transient Load Response	±5% Max (2% typ) deviation for load change of 50% to 100%, at slew rate of 1A/uSec, recovery time <1mSec
Over-Voltage Protection	Shut down at 110 to 130% with latched shut down
Temperature Protection	<b>System shut down due to 100±5°C internal case temperature, automatic reset</b>
Hold-Up Time at Full Load	20mSec Minimum
Power Sequencing	5V equal or higher than 3.3V, the time between 5V and 3.3V reach regulation should be 3mSec Max
<b>Load Start Up Current</b>	<b>20A constant current for 3.3V and 10A constant current for 5V</b>
Minimum Load	No minimum load required

### Monitoring Command & Control

Remote Sense	Available on V1 & V2. Total voltage compensation for cable losses with respect to the main output 400mV
Inhibit (INH#)	Turn the output to On and Off by electrical signal or dry contact 0-0.8V or Short: ON ; 2-5V or Open: OFF ; The maximum sink current is 15mA
Enable (EN#)	Contact closure to external ground to start unit. On shortest pin (last make, first break) Open - Turn OFF, not exceed 5V while OFF ; 0-0.8V or Short - Turn ON, maximum sink current is 15mA
Power Fail (FAL#)	Open collector logic "1" TTL signal which goes low signal whenever one or more outputs below 80%±5% of nominal rate. Maximum sink current is 15mA and maximum external voltage is 5V
Current Share	Option - Active for V1 & V2, Single-Wire Link
Hot Swap	Option - Internal O-Ring Diode FET's
Parallel Operation	Option - Maximum 8 converters can be in parallel
Over Temperature Warning (DEG#)	Open collector logic "1" TTL signal which goes low signal about 10°C before over temperature shut down
I <sup>2</sup> C	Option - I <sup>2</sup> C Passive data: s/n, model no., revision, and/or user defined data

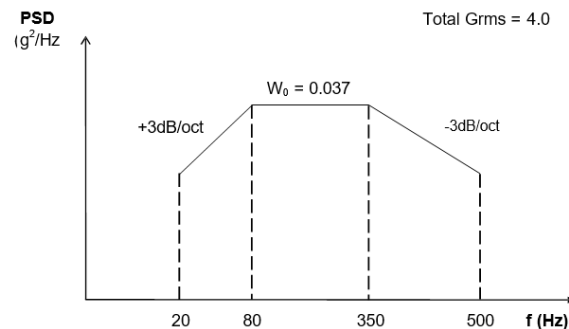
### Operation Status Indicators

Input Voltage OK	Green LED - Indicates when mains input voltage is present and power Fail signal OK
Output Failure	Red LED - Indicates when one or more outputs below 80%±5% of nominal rate and power Fail signal goes low

### Environmental Specifications

Operating Temperature	-40°C to +65°C full load with 250LFM Forced Air Cooling
Storage Temperature	-55°C to +125°C
Humidity	Up to 95% RH non-condensing
Shock	20g±3g 20mSec (17-23mSec) half sine duration of shock pulse
Vibration	Random vibration, 20Hz to 500Hz, 3 axis 4GRMS max. See figure 1
Altitude	Operation 6K feet. Non-operation 40K feet
MTBF	250,000 hours minimum per RIAC-HDBK217 at AUF. Ground fix and 50°C base plate
Conformal Coating	In accordance to IPC-CC-830 for PCB only

**Figure 1**



### Safety, Regulatory, & EMC Specifications

Safety Agency Compliance	UL 60950, EN-60950, CE-MARK
Harmonics	EN61000-3-2
Voltage Fluctuation	EN61000-4-3
ESD Susceptibility	EN61000-4-2 level 4 8KV air
Conducted & Radiated Emission	EN55022 Level A/FCC Class A conducted
Surge	EN61000-4-5 level 3 line-to-line 1KV line to chassis 2KV
Radiated Susceptibility	EN61000-4-3 level 3 10V/m
EFT/Burst	EN61000-4-4 level 3 ± 2KV
Conducted Disturbance	EN61000-4-6 level 2 3Vrms
RoHS	In full compliance with the RoHS directive # 2002/69/EC

\*Full compliance to PICMG 2.1 R1.0 CompactPCI Specification

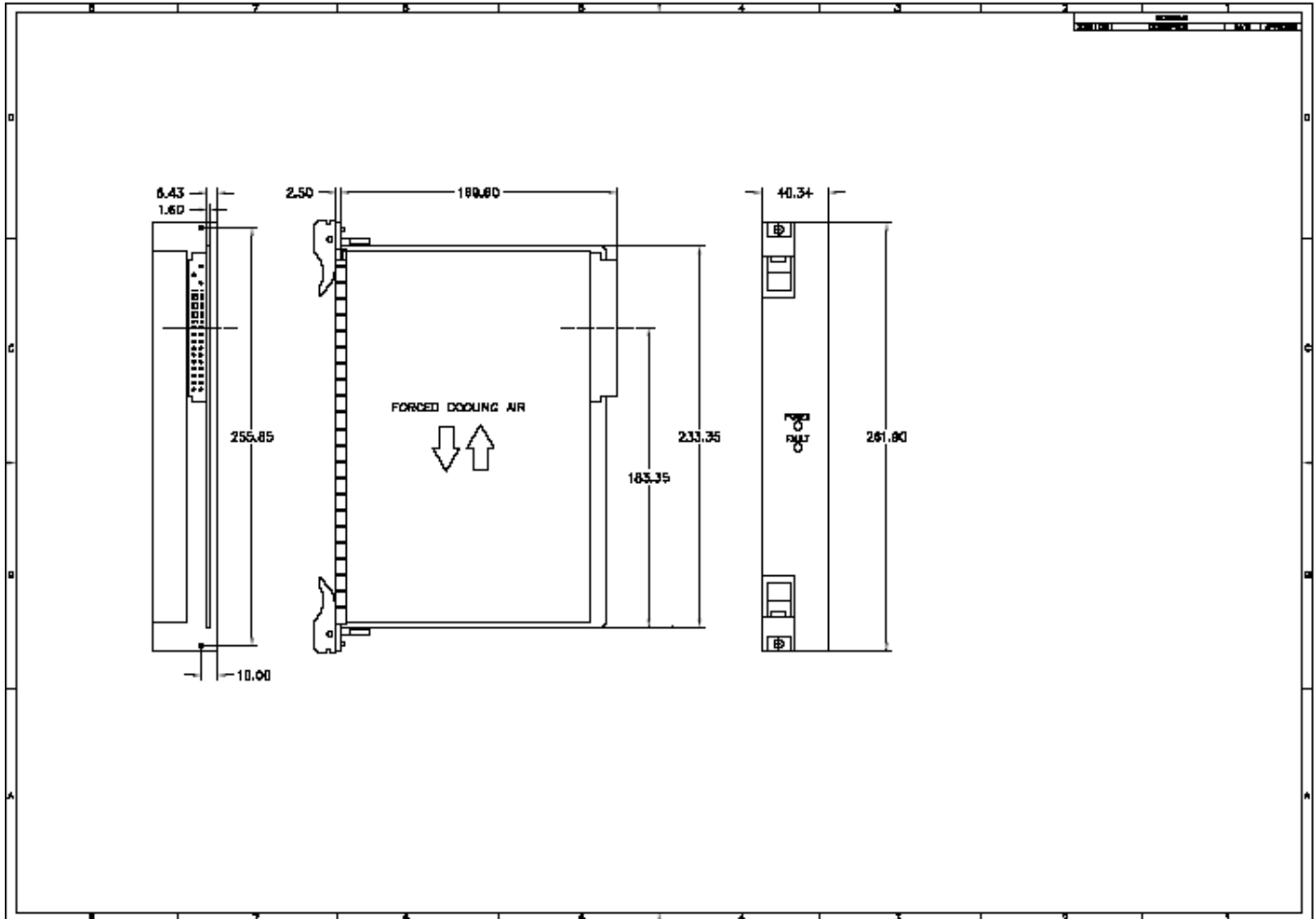
### Dielectric Withstand

Input to Case	2200 VDC
Input to Output	2200 VDC
Output to Case	100 VDC
Leakage Current	Less than 1mA at 230 VAC
Insulation Resistance	50MOhm at 100 VDC

### Physical & Mechanical Characteristics

Size	8HP 6U (40.34mm x 233.35mm x 162.5mm)
Weight	<2Kg
Metals	All metal surfaces shall be corrosion resistant or plated to resist corrosion. Outer surface texture and finish shall be in accordance with AMIL-STD-1568. Surface mating shall be conductive coated, smooth finish, and smooth surface DC resistance of less than 2.5mOhm under all environmental conditions.
PCB	The PCB shall be done as per IPC610 standard. All the PCB shall have conformal coating.
Name Plate	Material: Sheet aluminum 5052-h34 per QQ-A-250/B-0.5mm thickness Finish: Aluminum nameplate clear anodize, characters in black with adhesive on back side. (Remove all burrs and sharp edges eqv. to 0.2-0.4x45°). Tolerance: General ±0.2, Straightness ±0.1 Size: 25.4mm (1.0") x 63.5mm (2.5")

**Mechanical Outline**





**OUTPUT CONNECTOR - Positronic-PCIH47M400A1/AA**  
**PIN ASSIGNMENT**

Pin	Pin Type	Signal Name.	Description
1-4	Normal	V1	V1 Output
5-12	Normal	RTN	V1 and V2 Return
13-18	Normal	V2	V2 Output
19	Normal	RTN	V3 Return
20	Normal	V3	V3 Output
21	Normal	V4	V4 Output
22	Normal	RTN	Signal Return
23	Normal	RTN	Signal Return
24	Normal	RTN	V4 Return
25	Normal	GA-0	Geographic ADD-0 (option)
26	Normal	Reverse	Reverse
27	Short	EN#	Enable
28	Normal	GA-1	Geographic ADD-1 (option)
29	Normal	NC	Not Connected
30	Normal	V1 Sense	V1 Remote Sense
31	Normal	GA-2	Geographic ADD-2 (option)
32	Normal	NC	Not Connected
33	Normal	V2 Sense	V2 Remote Sense
34	Normal	S RTN	Sense Return
35	Normal	V1 Share	V1 Current Share
36	Normal	NC	Not Connected
37	Normal	IPMB_SCL	System Manager Bus (option)
38	Normal	DEG#	Degrade Signal
39	Normal	INH#	Open – ON Low - OFF
40	Normal	IPMB_SDA	System Manager Bus (option)
41	Normal	V2 Share	V2 Current Share
42	Normal	FAL#	Fail Signal
43	Normal	IPMB_PWR	Power–System Manager (option)
44	Normal	NC	Not Connected
45	Long	Chassis GND	Chassis GND
46	Long	AC Neutral	AC input Neutral
47	Long	AC Line	AC Input Line