

cPCI AC/DC Converter

110 Watt

110 PCB 220 Q05 E10

$V_{In\ Nom} = 220\ V_{AC}$

$V_{O1\ Nom} = 5.05\ V, I_{O1\ Nom} = 16\ A$ $V_{O2\ Nom} = 3.3\ V, I_{O2\ Nom} = 5\ A$

$V_{O3\ Nom} = 12\ V, I_{O3\ Nom} = 0.5\ A$ $V_{O4\ Nom} = -12\ V, I_{O4\ Nom} = -0.5\ A$

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
--------	-----------	-----------------	-----	-----	-----	------

INPUT

V_{In}	Input Voltage Range	Continuously	176	220	265	V_{AC}
$V_{In\ low}$	Switch ON		160		180	V_{AC}
	Switch OFF		150		160	V_{AC}
$V_{In\ high}$	Switch OFF	<i>Protecting semiconductors</i>	267	270	285	V_{AC}
λ	Power Factor	$V_{In} = 220\ V_{AC}, \sum P_O = 110\ W$	0.95	0.98		
f	Input line frequency		47	50	63	Hz
I_{leak}	Leakage current	$V_{In} = 265\ V_{AC}, 50\ Hz$		1	3	mA
R_{leak}	Leakage resistance	Input to ground @ 500 V_{DC}	10	30		G Ω
I_{In}	Input Current no load	$V_{In} = 265\ V_{AC}, \sum P_O = 0\ W$		15	20	mA
	Nominal Loads	$V_{In} = 220\ V_{AC}, \sum P_O = 110\ W$		0.6		A_{rms}
	Nominal Loads	$V_{In} = 176\ V_{AC}, \sum P_O = 110\ W$			1.0	A_{rms}
	Switch ON Input Current Integral	$V_{In} = 265\ V_{AC}$			10	A^2s
	Input Fuse			4 A		
C_{In}	Input Capacity Converter				1.5	μF
	Maximum External Line Inductivity				50	μH

OUTPUT POWER

$176\ V_{AC} \leq V_{In} \leq 265\ V_{AC}$

$P_{O\ Nom}$	Continuously	$\sum P_O$		110		W
V_{O1}	Voltage Factory Adjust		5.00	5.05	5.15	V_{DC}
ΔV_{O1}	Regulation Accuracy V_{O1} static (V_{In}, I_o, T_A, t)	$0\ W \leq P_{O1} \leq 80\ W$		$\leq 2\ %\ V_{O1\ Nom}$		
V_{O2}	Voltage Factory Adjust		3.25	3.33	3.40	V_{DC}
ΔV_{O2}	Regulation Accuracy V_{O2} static (V_{In}, I_o, T_A, t)	$0\ W \leq P_{O2} \leq 17\ W$		$\leq 2\ %\ V_{O2\ Nom}$		
V_{O3}	Voltage Factory Adjust		11.9	12.0	12.1	V_{DC}
ΔV_{O3}	Regulation Accuracy V_{O3} static (V_{In}, I_o, T_A, t)	$0\ W \leq P_{O3} \leq 6\ W$		$\leq 3\ %\ V_{O3\ Nom}$		
V_{O4}	Voltage Factory Adjust		-11.9	-12.0	-12.1	V_{DC}
ΔV_{O4}	Regulation Accuracy V_{O4} static (V_{In}, I_o, T_A, t)	$0\ W \leq P_{O4} \leq 6\ W$		$\leq 3.0\ %\ V_{O4\ Nom}$		
$V_{O\ pp}$	Ripple & Noise in acc. to $V_{O, nom}$	V_{O1-O4} : Nominal Loads BW 20 MHz			1.5	%
t_{On}	Set Up Time V_{O1-O4}	$0\ W \leq P_O \leq 110\ W$		1500	2000	ms
t_H	Hold Up Time @Input Voltage Interruption	3.3V 5A and 5.0V 16A	20			ms
I_{O1}	Output Current	$V_{O1} : 5.05\ V$		16.0		A
I_{O2}	Output Current	$V_{O2} : 3.33\ V$		5.0		A
I_{O3}	Output Current	$V_{O3} : +12\ V$		0.5		A
I_{O4}	Output Current	$V_{O4} : -12\ V$		-0.5		A
	Threshold Output Current Limit $I_{O1/O2/O3/O4}$			120 %	$\times I_{O1/O2/O3/O4\ Nom}$	
I_{osc}	Output Short Circuit Current			130 %	$\times I_{O1/O2/O3/O4\ Nom}$	

Signaling

LED	V_{In}, V_{O1-4} (V_{oi} = summary signalling)	LED Green at front plate LED Red at front plate	ON, when V_{In} o.k. ON, when V_{oi} not o.k.
-----	---	--	--

CONTROL

Enable	Converter ON: EN connected to GND Converter OFF: EN open	Potential ref. to output GND				
Inhibit	Modular Power Operation		INH# = Low EN# = Low Power status = "OFF"	Low Open "OFF"	Open Low "ON"	Open Open "OFF"

COMMON DATAS

f_1	Switching Frequency	PFC converter		65		kHz
f_2		Step Down converter		100		kHz
η	Efficiency	$P_O \geq 0.7 \times P_{O\ Nom}$	81	83		%
	MTBF (SN 29500)	$V_{In} = 220\ V_{AC}, P_O = 110\ W, T_A = +40^\circ C$		400 000		h
	Expected life time, used Al caps: 7'000h	$L_9 = L_0 \cdot 2^{-(T-10K)/10K}$ (Arrhenius law)		112'000		h
	No load & Short Circuit Approved			continuously		

Life Time: mainly limited by used Al-caps. L_0 = OEM guaranteed life (h) at defined temperature here + 105°C.

L_9 is expected life (h) at desired ambient temperature

Example: L for 105°C Al capacitor = 7'000h $\rightarrow L_9$ (+ 55°C) = 7'000h * 2^{-(105°C - 65°C)/10K} = 112'000h

$\vartheta_{cap} = T_A + 40^\circ C + \vartheta$ (internal heat) = 25K = + 65°C

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SAFETY / DIMENSIONS						
	Creepage, Clearance OV2 Port 10 Pollution Degree PD2 PCB FR4, V ₀ , T _G = + 140°C	Primary Secondary Primary Chassis Secondary Chassis	4.0 2.0 2.0			mm mm mm
	Isolation Test Voltage Piece Test: Ramp Function: 2s – 3s – 2s Type Test: 1Min.	Primary Secondary Primary Chassis Secondary Chassis			3'500 2'500 1'000	V _{DC} V _{DC} V _{DC}
	Isolation resistance @ 500 _{DC} test voltage	Primary Secondary	15			GΩ
	Connector	Positronic Required female plug:	PCIH47M400A1/11 PCIH47F300A1/AA			
	Protection Class, Protection Degree		I, IP 20			
	Dimensions incl. Front Plate	w x h x d (3RU / 8HP, 19" rack)	128.4 x 40.6 x 169.4			mm
	Weight			750		g

AMBIENT CONDITIONS						
T _A	Operating temperature range	See derating curve page 3	- 40		+ 85	°C
T _{St}	Storage temperature Range		- 40		+ 85	°C
	Cooling		free convection			
	Humidity		75% averaged per year 95% 30 days			
	Vibration / Shock	IEC 61373, IEC 68-2-27, BN 411002 Kat. I 3 Shocks each Axis	50 m / s ² , 30 ms			

EMC			
	Radiation *)	Line & Radiated	EN 61000 – 6 – 4 A
	Immunity *)	ESD EN 61000 - 4 - 2	6 kV / 8 kV Performance Criteria - A -
		High Frequency Field EN 61000 - 4 - 3	20 V / m 80 MHz ... 2,5 GHz - Performance Criteria - A - *)
		Burst EN 61000 - 4 - 4	Level 4 asym., sym. Performance Criteria - A -
		Surge EN 61000 - 4 – 5	2 kV asym. / 1 kV sym. Performance Criteria - A -
		HF – Injection EN 61000 - 4 - 6	10 V _{rms} , R _i = 150 Ω Performance Criteria - A -

STANDARDS						
Applied Standards:	SN 29500	VDE 0106-1	EN 50124 - 1: 1996	EN 61000 - 4 - 2...6	EN 50529	
	IEC/EN 60255-5	IEC/EN 60255-6	EN 50125 - 1	EN 60068 - 2 - 6, 2...32	IEC/EN60707	
	IEC 60255-11	IEC 61373: 1999	EN 60721 - 3 - 5	IEC 60068-2-1 / 2 / 14	IEC 61373	

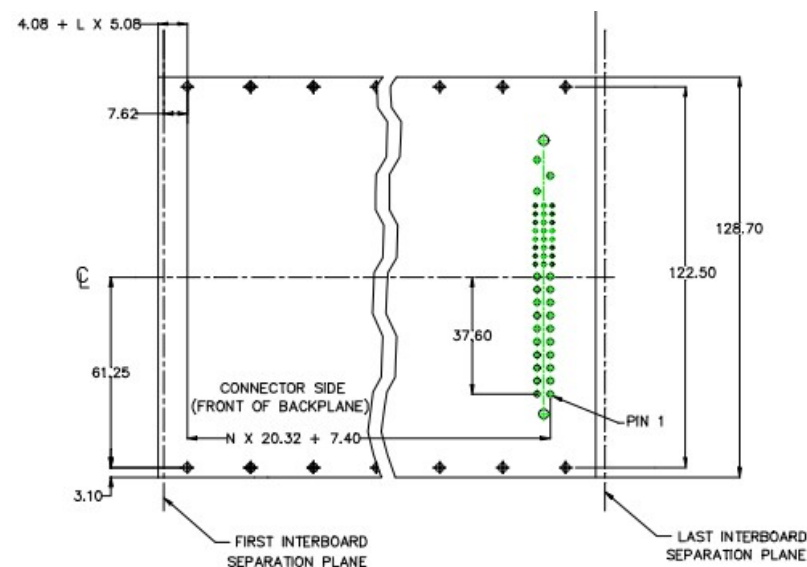
Technical data referenced at: - 40° C ≤ T_A ≤ + 60° C, 176 V_{AC} ≤ V_{In} ≤ 265 V_{AC}, if not otherwise specified.
 Temperature reference point: 10 cm below dc/dc converter unit. Please, consider free air convection is possible
 *) In closed housing, emission: radiated @ EN 50121-3-2, conducted @ EN 50121-3-2
 **) 1400 MHz – 2100MHz 10V/m 2100MHz – 2500MHz 5V/m 2000MHz – 2700MHz 1V/m

Pin assignment

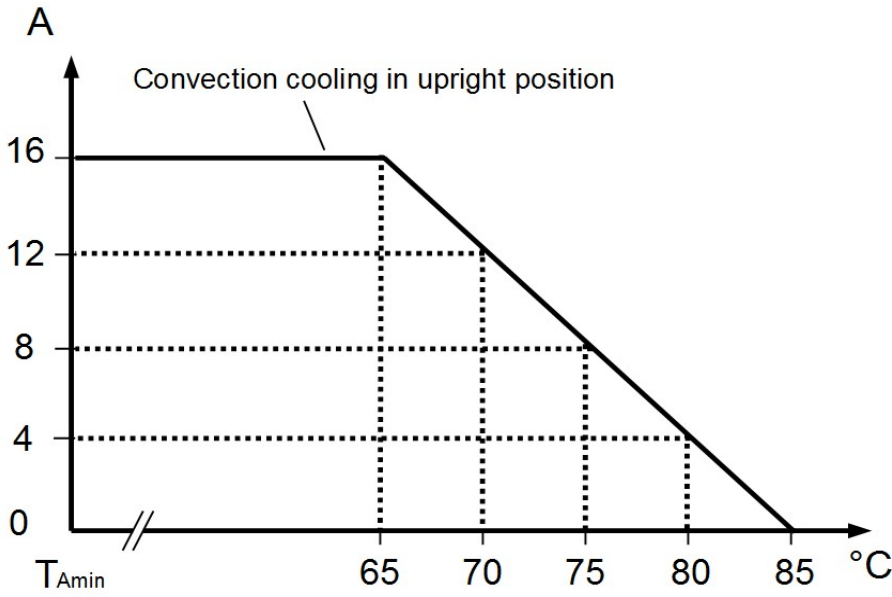
Pin	Signals Output
1-4	V ₀₁ (+ 5V)
5-12	V ₀₁ and V ₀₂ Return
13-18	V ₀₂ (+ 3,3V)
19	V ₀₃ Return
20	V ₀₃ (+ 12V)
21	V ₀₄ (- 12V)
22	Signal Return
23	reserved
24	V ₀₄ Return
26	reserved
27	EN (Enable)
29	V ₀₁ Adjust
30	V ₀₁ Sense
32	V ₀₂ Adjust
33	V ₀₂ Sense
34	Sense Return
36	V ₀₃ Sense
39	INH (Inhibit)
42	FAL (Fail Signal)
Signals Input and PE	
45	PE (chassis ground)
46	+ AC Input (L)
47	- AC Input (N)

Pin 25,28,31,35,37,38,40,41 n.c.

Mechanical drawing backplane



Note, that the slot in the card guide and injector/ejector PCB mounting surface are shifted 2.54 mm to the right respect to the front panel keying and alignment pin.



Output current at 5V output versus temperature T_a at $V_{in Nom}$
(Only using 5V output)

