HTCA2000 SERIES

RoHS COMPLIANT

2000 Watt Single Output Models

- 13.7 x 4.00 x 1.58" Hot-Swap Package

Features:

- Universal AC Input Range (90-264 VAC)
- Active Power Factor Correction (0.98 PF Typical)
- Hot-Swap / N+1 Redundant Operation
- 1400 Watts Low-Line / 2000Watts High-Line Operation
- Analog / I²C / TxRx Interface for Status & Control
- CE Level IV Compliant
- Front Panel LED Indicators
- LED Indicator for Charging Status

INPUT:

Input Voltage	90~264 VAC (Universal AC Input)
Input Frequency	47-63Hz
Inrush Current	39Arms @ 230 VAC Cold Start
Input Current	13.5 / 9.5A @ 115 / 230 VAC
Input Protection	Single Fuse
Hold-Up Time	15 / 8ms Minimum @ 115 / 230 VAC
Leakage Current	<900 µA @ 230 VAC Maximum
Power Factor	EN61000-3-2 (0.99 PF Typical)
No Load power	20 Watt at 115Vac/ 18 Watt at 230Vac

GENERAL:

Efficiency	93% @ 230 VAC / Full Load
Operating Temperature	-40-50°C, derate linearly to 60% load at 50-60°C
Storage Temperature	-40°C to +85°C
Over-Temp Protection	Auto-Recovery
Cooling	Internal Ball Bearuing Fans
Operating Humidity	5-90% RH, Non-Condensing
Vibration	5 ~ 50 Hz, acceleration 7.35 m/s*s on X,Y and Z Axis
MTBF	>100k Hrs (according to MIL-HBK-217F) at 30°C

OUTPUT:

Adjustment Range	Via I²C /RxTX Interface
Minimum Load	none required
Line Regulation	±0.5%
Load Regulation	±1% (5VSB = ±3%)
Ripple & Noise	±1% pk-pk @ 20MHz
Overload Protection	120-135% of max power (Foldback)
Over Voltage	Software Programmed
Short Circuit Protection	Trip without damage & auto-recovery
Transient Response	<520mV, recovers <2ms following a 25% load change
Switching Frequency	70KHz for PFC, 120KHz for PWM

EMC:

Electrostatic Discharge	EN61000-4-2, ±4KV Contact / ±8KV Air Discharge
Radiated Susceptibility	EN61000-4-3, 26-1000MHz, 10V/M, 80% AM
EFT / Bursts	EN61000-4-4, ±2KV
Surges	EN61000-4-5, ±2KV Line-Earth, ±1KV Line-Line
Conducted Immunity	EN61000-4-6, 0.15-800MHz, 10V, 80% AM
Voltage Dips	EN61000-4-100, 95% Dip & 10ms, 30% Dip & 500ms
Voltage Interruptions	EN61000-4-11, 95% reduction, 5s
Fluctuations & Flicker	EN61000-3-3

STATUS / CONTROL:

5VSB	500mA (Always present and on)
DC Okay	Active Low
Fan Fail	Active Low
Enable	Active Low to Enable
Inhibit	Active Low to Inhibit
P/S Present	Pull to Low
Current Share	V1 Only
OVer Temp Alarm	Active Low
AC Fail	Active Low

APPROVALS:

Emissions	EN55022 "B", FCC Part 15 Subject J Class B
Safety Approvals	IEC 60950-1 Class I

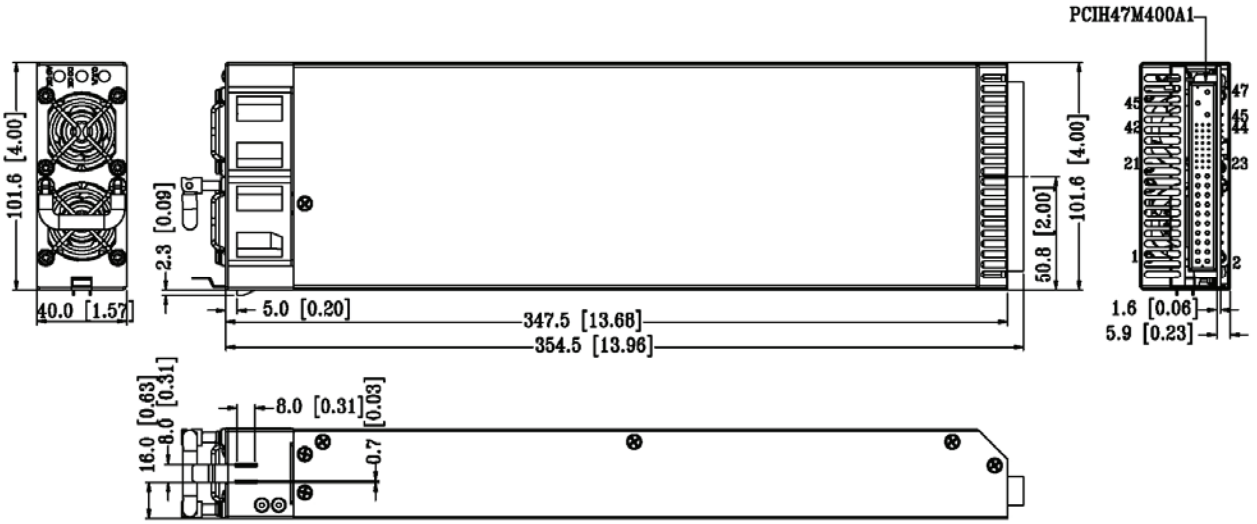
HTCA2000 SERIES

Ouput Specifications:

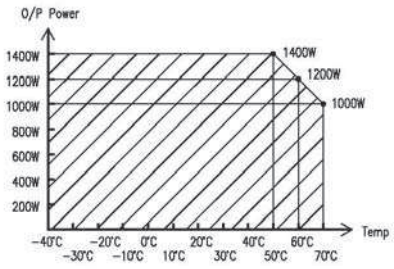
Model:	Vout	Iout 115VAC	Iout 230VAC
HTCA2000R-D500E	+50V	28A	40A
HTCA2000R-D840E	+84V	16.7A	24A

* HTCA2000R can provide maximum power 1400Watt while Vin at 90-180Vac and 2000Watt while Vin at 180-264Vac.

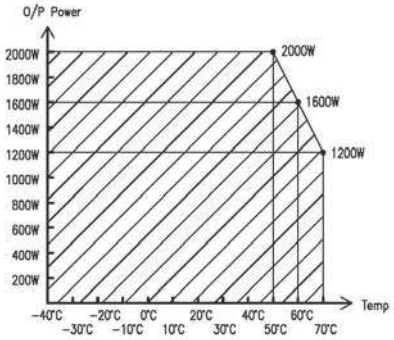
Mechanical Dimensions:



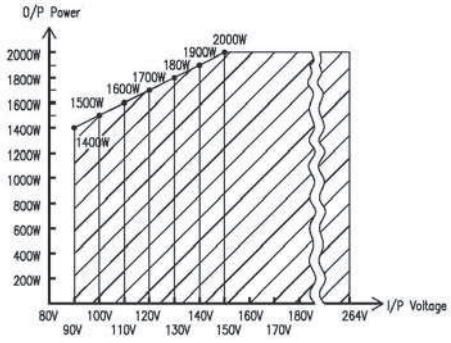
DERATING CURVE



POWER DERATING CURVE
(When 180VAC ≥ I/P > 90VAC)



POWER DERATING CURVE
(When 264VAC ≥ I/P > 180VAC)



POWER DERATING CURVE
(When Ta ≤ 50°C)

HTCA2000 SERIES

INPUT & OUTPUT CONNECTORS PIN ASSIGNMENT

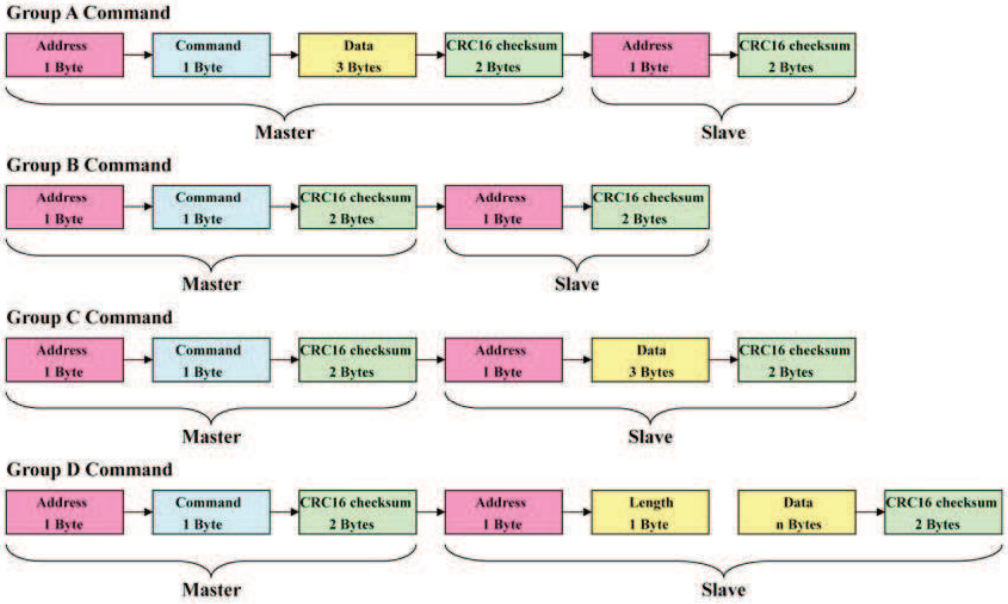
PIN NO.	ASSIGNMENT	REMARKS
3,4,5,6,7,8	V0+	Output voltage VO1
9,10,11,12,13,14	V0-	Return of output voltage VO1
19,43	+5VS	+5V Signal
22	S-RTN	Return of +5V Signal (Same level with VO-)
23	DC_OK	Active Low for DC OK
25	A0	Address A0 of I^2C (Internal pull to High 3.3V)
26	Fan_Fail	Active Low for Fan Fail
27	EN	Active Low to Enable
28	A1	Address A1 of I^2C (Internal pull to High 3.3V)
31	A2	Address A2 of I^2C (Internal pull to High 3.3V)
32	P0.14(Alert)	Debug use & Alert for PM-Bus function (Active High to Run)
33	nRest	Debug use(Active to Reset MCU)
34	PS_PRNT	Pull to Low
35	CS	Current Share bus for VO1
36	TXD1	Tx (R232 for ICP)
37	SCL	Clock Line of I^2C Interface
38	OTW	Active Low for Over Temperature
39	IHN	Active Low to Inhibit
40	SDA	Data Line of I^2C Interface
41	RXD1	Rx (R232 for ICP)
42	AC_Fail	Active Low for AC Fail
44	H_POWER	Active Low for High Power
45	AC-G	AC-Earth/Ground Connection
46	AC-N	AC-Neutral Connection
47	AC-L	AC-Line Connection

FRONT PANEL LED STATUS & MONITORING SIGNAL

Condition	Front Panel LED Status			Monitoring Signal				
	AC OK (Green)	DC OK (Green)	Fault (Red)	AC_Fail	DC_OK	Fan_Fail	OTW	PS_PRNT
OK	1	1	0	High	Low	High	High	Low
Thermal Alarm	1	1	Blinks	High	Low	High	Low	Low
Thermal Shutdown	1	0	1	High	High	High	Low	Low
Defective Fan	1	0	1	High	High	Low	High	Low
Blown AC Fuse in unit	1	0	1	Low	High	High	High	Low
No AC <10mS (Single Unit)	0	1	0	Low	Low	High	High	Low
AC present but no within limits	Blinks	0	0	Low	High	High	High	Low
AC not present	0	0	0	Low	High	High	High	Low
Over Voltage Shutdown	1	0	1	High	High	Low	High	Low
Over Current	1	Blinks	0	High	Low	High	High	Low
Standby	1	0	0	High	High	High	High	Low

HTBA2000 SERIES

I²C COMMAND FORMAT



Note: 1. There are four types of I2C command ,Group A-D, as below for MCU in HTC2000R series.
2. The Frequency of I2C is set at 400KHz.
3. After getting the command, the Slave must reply the Master within the period between 1uS and 2mS to avoid "time-out" problem.
4. The time between Start bit of each byte format should be less then 400uS to avoid “Time-out” problem.

I²C COMMAND LIST

GROUP	COMMAND	DESCRIPTION	REMARK
A	AAh	Set Output Voltage in mV.	Use 3 bytes binary value in mV and MSB first
A	ACh	Set High line Output Current in mA	Use 3 bytes binary value in mA and MSB first
A	AEh	Set Low line Output Current in mA	Use 3 bytes binary value in mA and MSB first.
B	BAh	Turn on the main output.	N/A
B	BCh	Turn off the main output.	N/A
C	C1h	Read Fan 1 speed in RPM.	Use 3 bytes binary value in RPM and MSB first.
C	C2h	Read Fan 2 speed in RPM.	Use 3 bytes binary value in RPM and MSB first.
C	C3h	Read Output Voltage (Before Oring Diode) in mV	Use 3 bytes binary value in mV and MSB first.
C	C4h	Read Output Voltage (After Oring Diode) in mV.	Use 3 bytes binary value in mV and MSB first.
C	C5h	Read +5VSB Voltage (Before Oring Diode) in mV	Use 3 bytes binary value in mV and MSB first.
C	C6h	Read +5VS Voltage (After Oring Diode) in mV	Use 3 bytes binary value in mV and MSB first.
C	C7h	Read Ambient Temperature in ^{O}C./1000.	Use 3 bytes binary value in ^{O}C./1000. and MSB first.
C	C8h	Read Working Temperature in ^{O}C./1000.	Use 3 bytes binary value in ^{O}C./1000. and MSB first.
C	C9h	Read Output Current in mA.	Use 3 bytes binary value in mA and MSB first.
C	CAh	Read the setting Voltage in mV	Use 3 bytes binary value in mV and MSB first.
C	CBh	Read the High Power setting Current in mA	Use 3 bytes binary value in mA and MSB first.
C	CCh	Read the Low Power setting Current in mA	Use 3 bytes binary value in mA and MSB first.
C	CDh	Read Warming Status 1 : Warming, 0 : Normal	00h | 00h | 000b | OTW | AC-Fail | Fan_F | DC_OK | H_Power
D	DAh	Read equipment.	One Length byte & n data bytes in ASCII code.
D	DCh	Read Hardware Version.	One Length byte & n data bytes in ASCII code.

HBA2000 SERIES

ADDRESS DEFINITION

A2	A1	A0	I^2C Bits 7-1	EEPROM(24C02) Bits 7-1
0	0	0	0011 000	1010 000
0	0	1	0011 001	1010 001
0	1	0	0011 010	1010 010
0	1	1	0011 011	1010 011
1	0	0	0011 100	1010 100
1	0	1	0011 101	1010 101
1	1	0	0011 110	1010 110
1	1	1	0011 111	1010 111

Tx/Rx COMMAND FORMAT

ASSIGNMENT	DESCRIPTION
F1	Read Fan 1 output
F2	Read Fan 2 output
V1	Read Output Voltage (Before Oring Diode)
V2	Read Output Voltage (After Oring Diode)
V3	Read +5VSB Voltage (Before Oring Diode)
V4	Read +5VSB Voltage (After Oring Diode)
SV	Set Output Voltage in mV (ex. SV 50000)
SH	Set High power Output Current in mA (ex. SH 40000)
SL	Set Low power Output Current in mA (ex. SL 28000)
C1	Read Output Current
T1	Read Ambient Temperature
T2	Read Working Temperature
RW	Read Output warning 1:warning 0:normal (OTW, AC_Fail, Fan_F, DC_OK, H_POWER)
RV	Read Output Voltage
RC	Read Output Current
Rv	Read Hardware Version & Software Version
RE	Read Equipment
PU	Power On
PD	Power Down
CR	Clear Record
RR	Read Record

HBA2000 SERIES

Tx/Rx COMMAND LIST

COMMAND	DESCRIPTION				
F1	Read Fan 1 speed in RPM				
F2	Read Fan 2 speed in RPM				
V1	Read Output Voltage (Before Oring Diode) in Volt				
V2	Read Output Voltage (After Oring Diode) in Volt				
V3	Read +5VSB Voltage (Before Oring Diode) in Volt				
V4	Read +5VS Voltage (After Oring Diode) in Volt				
T1	Read Ambient Temperature in °C				
T2	Read Working Temperature in °C				
C1	Read Output Current in mA				
SV	Set Output Voltage in mV				
SH	Set High line Output Current in mA				
SL	Set Low line Output Current in mA				
RV	Read the setting Voltage in Volt				
RC	Read the setting Current in Amp				
RW	Read Warming Status 1 : Warming, 0 : Normal				
	OTW	AC-Fail	FAN_F	DC_OK	H_Power
PU	Turn on the main output				
PD	Turn off the main output				
Rv	Read Hardware Version & Software version				
RE	Read equipment				
CR	Clear Record				
RR	Read Record				

Tx/Rx RECORD DEFINITION

ITEM	RECORD NUMBER	RECORD DESCRIPTION	REMARK
1	0h	Power-off by out of range of AC input voltage	AD1, AD2
2	1h	Power-off by out of range of Ambient Temperature	T1
3	2h	Power-off by out of range of Working Temperature	T2
4	3h	Power-off by out of range of output current	OCP/OLP/SC
5	4h	Power-off by RS232	N/A
6	5h	Power-off by I^2C	N/A
7	6h	Voltage setting is modified	N/A
8	7h	Current setting is modified	N/A
9	8h	Un-known	N/A
10	9h	N/A	N/A
11	Ah	N/A	N/A
12	Bh	N/A	N/A
13	Ch	N/A	N/A
14	Dh	N/A	N/A
15	Eh	N/A	N/A
16	Fh	N/A	N/A