



# TFX PC Power Specifications

Model: HK320-71PP

Consumer : Imply

File NO.: EQS-731-1225

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Issue date:2010-05-28





## HK320-71PP Specification

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## 1.0 Input Characteristics:

### 1.1 Input Voltage Range:

90Vac to 265Vac, single phase.

**Table1. Input Voltage Range**

RANGE	MINIMUM	NORMAL	MAXIMUM	UNITS
High Range	90	100~240	265	Vrms

### 1.2 Input Frequency Range:

50+/-3Hz and 60+/-3Hz; Normal Frequency Range: 50-60Hz

### 1.3 Input current

Input current is 5A Max,at 115V/60Hz

### 1.4 Inrush current:

Power supply inrush current shall be less than the ratings of its critical components (including bulk rectifiers, fuses, and surge limiting device) under all conditions of line voltage of Section 1.1.

### 1.5 Power Efficiency:

The efficiency measurements are performed at 115Vac and 230Vac.

#### 220W 80+ efficiency test loading condication

LOAD	+12V	+5V	+3.3V	-12V	+5VSB
20%	2.49A	1.70A	0.97A	0.04A	0.37A
50%	6.23A	4.26A	2.43A	0.11A	0.92A
100%	12.46A	8.52A	4.87A	0.22A	1.83A

(1)AC input 115V/50Hz, 100% full load, efficiency is more than 80%。

(2)AC input 115V/50Hz , 50% full load, efficiency is more than 80%。

(3)AC input 115V/50Hz , 20% full load, , efficiency is more than 80%。

### 1.6 Power factor

The power supply must use APFC, and  $PF \geq 0.90$  @full load at AC input 115Vac~230Vac,50~60Hz

### 1.7 Standby Consumption

AC input power should not exceed 1W under +5Vsb /0.1A, at AC input 230Vac

### 1.8 Harmonic Current:

(1) The harmonic of the power line and neutral current shall comply the standard IEC61000-3-2 for class D equipment.

(2) Measurement shall be performed at 75W input power and full output load, Input voltage shall be 230Vac/50Hz, Don't test in process under low range.

## 2.0 Output Characteristics:

### 2.1 Static output characteristics:

**Table2. Static output characteristics**

Output Voltage	Load			Regulation	Ripple & Noise
	Min	Max	Surge		Max mV P-P
+5V	0.2A	14A	16A	+/- 5%	50mV
+12V	0.2A	17A	19A	+/- 5%	120mV
+5VSb	0.005A	2.5A		+/- 5%	50mV
+3.3V	0.1A	8A	12A	+/- 5%	50mV
-12V	0A	0.3A		+/- 10%	120mV

At 25°C & 40°C

- (1) The total combined 3.3V&5V power shall not exceed 80W.
- (2) The total combined 3.3V/5V/+12V power shall not exceed 210W.
- (3) The continuous output power shall not exceed 220W.
- (4) Peak current may last up to 10mS with not more than one occurrence per minute

### 2.2 The cross-load regulation is defined in the matrix below (UNIT: A)

**Table 3. Cross Regulation**

Range	+5V	+12V	-12V	+3.3V	+5Vsb
1	0.2	0.2	0.0	0.1	0.005
2	14.0	5.0	0.3	3.0	0.5
3	4.0	17.0	0.2	5.0	1.0
4	4.0	5.0	0.2	4.0	1.5
5	11.0	5.0	0.1	8.0	2.5
6	8.52	12.46	0.22	4.87	1.83

Notes: A 0.1uF ceramic disk capacitor and 10uF tantalum capacitors should be put across output terminals during ripple & noise test. The oscilloscope bandwidth is set at 20 MHz and co-axial probe will be used to measure it.

### 2.3 Dynamic Load:

The following transient loads are to be applied to the output. The waveform shall be a square wave with the slope of the rise and fall at 0.1A/μs. The square wave shall have a frequency 50Hz to 10KHz with a duty cycle of 10 to 90%.

The output voltages shall not exceed regulation limits as defined in Table 2 under the following condition:

#### TRANSIENT VOLTAGE TOLERANCE

**Table4. Dynamic Load Step Sizes**

NOM. OUTPUT VOLTAGE (VDC)	CURRENT I <sub>min</sub>	CURRENT I <sub>max</sub>	STEP LOAD CHANGE (%)	TRANSIENT TOLERANCE (%)
+5V	0.2A	14A	30	±5
+12V	0.2A	17A	40	±5
+3.3V	0.1A	8A	30	±5

(Adding external capacitor: 5V/6000uF, 12V/6000uF, 3.3V/6000uF, -12V/350uF, 5Vaux=350uF)

### 2.4 Capacitive Load:

The power supply should be able to power up and operate with the regulation limits defined in Table 2, with the following capacitances simultaneously present on the DC outputs.

**Table5. Output Capacitive Loads**

Output	Capacitive Load
+12V	6000μF
+5V	6000μF
+3.3V	6000μF
-12V	350μF
+5VSb	350μF

### 2.5 The power supply shall have the output connector and wire harness configurations.

## 3.0 Protection

### 3.1 Over Voltage Protection:

+5V:7V max, +12V: 15.6V max, +3.3V: 4.7V max.

### 3.2 Short Circuit Protection:

The main output shall shut down and latch off for shorting +5V, +12V, -12V or +3.3V rails to DC-return and shorting.

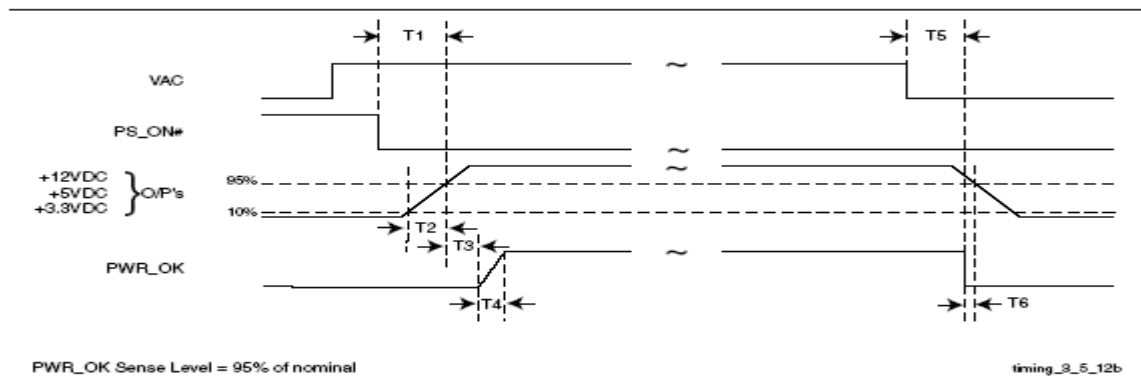
### 3.3 Over Power Protection:

The main output will be shutdown and latch off when output power is at 280W~400W

### 3.4 Reset after shutdown:

When the power supply latches into shutdown condition due to a fault on an output (over current, over voltage or short circuit), the protection latch shall reset within 30S after the fault has been removed and the ON/Off signal has switched state. Also, the latch shall reset within 30S when AC power has been removed.

## 4.0 Time Sequence ( Test at 115V or 230V )



**Power Supply Timing**

### 4.1 Power-on time T1

The power-on time is defined as the time from when PS\_ON# is pulled low to when the +12 VDC, +5 VDC, and +3.3 VDC outputs are within the regulation ranges specified in Section 2.1. The power-on time shall be less than 500 ms.

### 4.2 Rise time T2

The output voltages shall rise from  $\leq 10\%$  of nominal to within the regulation ranges specified in Section 2.1 within 0.1 ms to 20 ms.

### 4.3 PWR\_OK delay T3

The Power Good signal shall have a turn-on delay of at least 100mS but not greater than 500 mS from the time the 3.3V and +5V output has reached their minimum regulation level.

### 4.4 PWR\_OK rise time T4

The Power Good signal shall have a rise time (measured from the 10% point to the 90% point) of less than 10 milliseconds.

### 4.5 AC loss to PWR\_OK hold-up time T5

The Power Good Signal shall remain an up level for at least 16msec after AC power is removed and shall go to a down level before the 3.3V or +5V falls below their regulation limit, test at 75% of full load.

### 4.6. Power Fail Delay Time T6

The Power\_Down warning signal at least 0.5msec shall have a power Good Signal change Low Voltage to the 3.3V or +5V falls below their regulation limit, test at 75% of full load.

### 4.7 Power OK (POK)

The power supply shall provide a "Power Good" signal to reset system logic, indicate proper operation of the power supply, and give advance warning of impending loss of regulation at turn off.

The electrical characteristics for the Power OK output driver are shown below:

**Table6. Power OK Signal Characteristics**

Power OK Signal Characteristics	
Signal Type	+5V TTL Compatible
Logic Level Low	<0.4V while sinking 4mA
Logic Level High	Between 2.4V and 5V output while sourcing 200μA
High-State Output Impedance	1kΩ from output to common

#### 4.7 PS\_ON

PS\_ON is an active low, +5V tolerant TTL signal that allow the motherboard to remotely control the power supply. An internal pull-up resistor inside the power supply shall provide a TTL high output logic level, once an AC input voltage has been applied to the power supply. The electrical characteristics for the PS\_ON signal are shown below:

**Table7. PS-ON Signal Characteristics**

PS-ON Signal Characteristics		
Signal Description	Min	Max
Input Low Voltage	0.0V	0.8V
Input Low Current (Vin=0.4V)	-	-1.6mA
Input High Voltage (Iin=-200μA)	2.0V	
VIH open circuit	-	5.25V

#### 5.0 Auxiliary 5V Output:

The 5V auxiliary output will be active and in regulation whenever an AC input within the specified operating range is applied to the power supply input. The PS\_ON pin of P1 will not affect the 5V auxiliary output.

#### 6.0 Environment:

##### 6.1 Operating ambient:

**Table8. Operating ambient**

Air Temperature	0 to 40 degrees centigrade
Relative Humidity	5 to 85 percent, non-condensing

##### 6.2 Shipping and Storage:

**Table9. Shipping and Storage**

Air Temperature	-40 to 55 degrees centigrade
Relative Humidity	5 to 95 percent, including condensation

##### 6.3 Altitude:

Operating to 3050 meters(10,000 ft)

Non-operating to 15250 meters (50,000 ft).

##### 6.4 Cooling:

The power supply shall provide forced air cooling for the host system.

##### 6.5 Fan speed control

The power supply shall contain thermal sensing circuitry capable of varying fan speed.





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## **7.0 Safety and EMC**

### **7.1 SAFETY REQUIREMENTS AND Certify:**

### **7.2 Conducted and Radiated Emissions:**

### **7.3 ESD:**

ESD of the power supply shall comply with the requirements of IEC61000-4-2 Level 4.

### **7.4 EFT:**

EFT of the power supply shall comply with the requirements of IEC61000-4-4 Level 3.

### **7.5 Surge Susceptibility:**

Surge Susceptibility of the power supply shall comply with the requirements of IEC61000-4-5 Level 3.

### **7.6 Hi-Pot:**

Input to GND: Voltage 1800VAC Time 3.0S, Cut off current 10mA MAX

### **7.7 Grounding Continuity Test:**

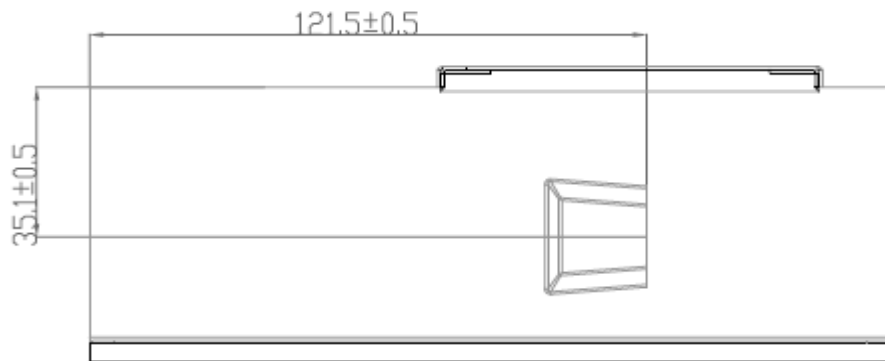
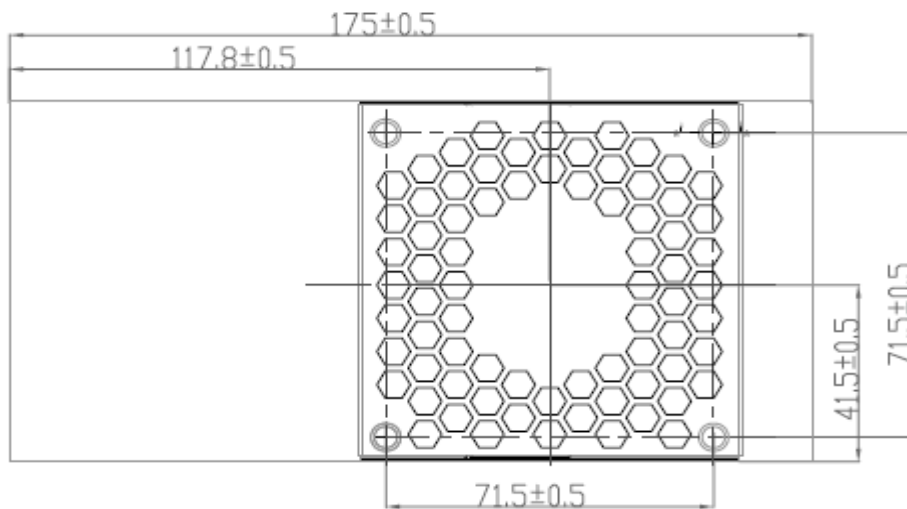
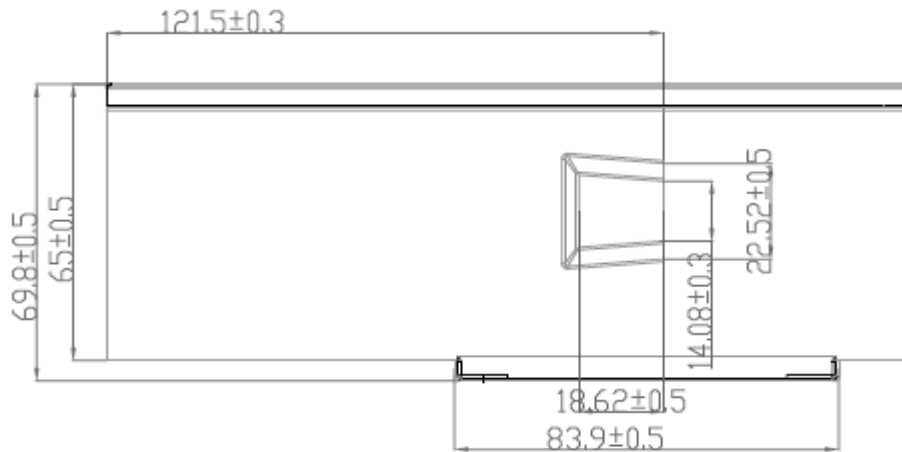
100mΩ MAX at 25.0A .

### **7.8 Ground Leakage Current:**

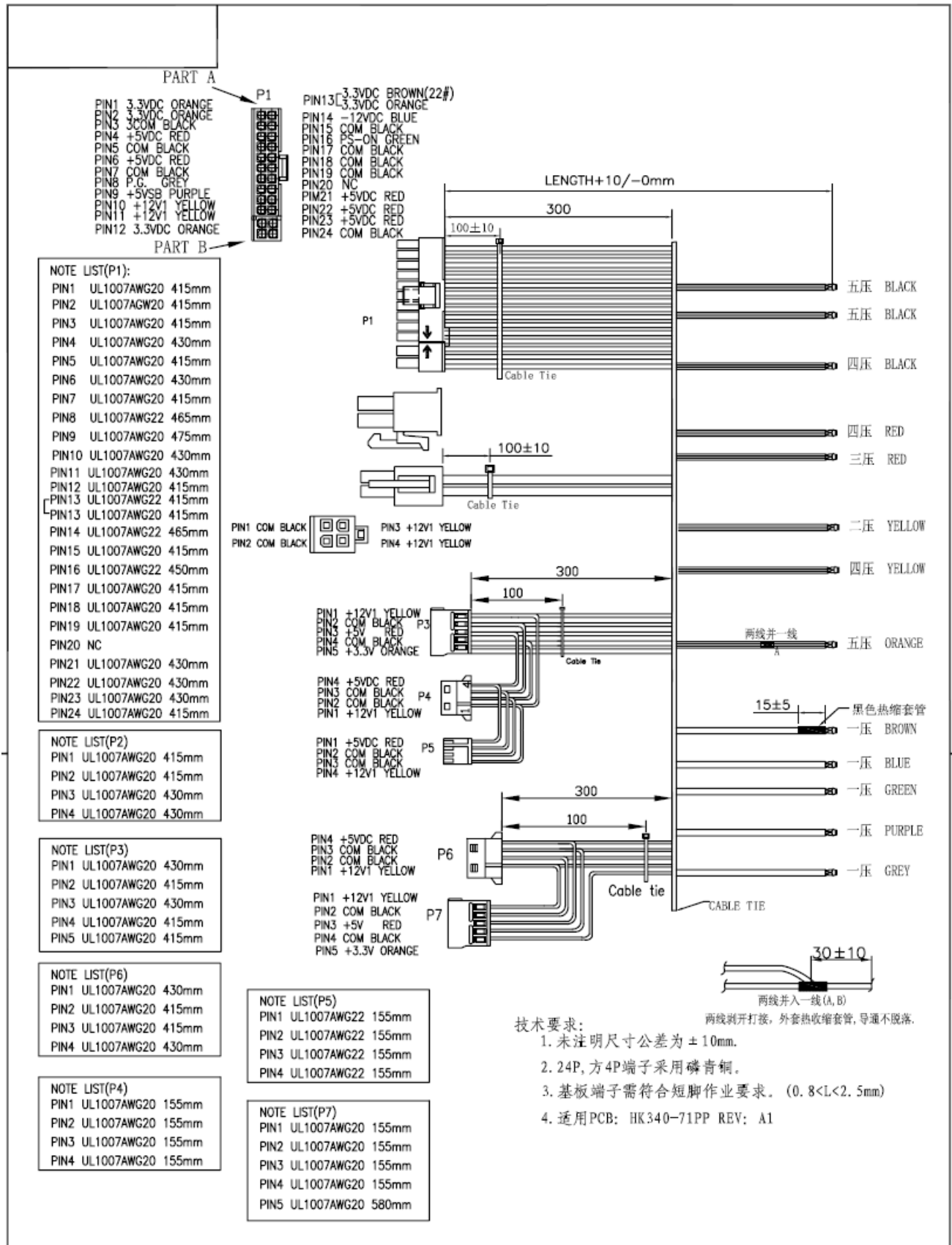
3.5mA MAX. at 264V 50Hz

**8.0 Mechanical:**

**8.1 Mechanical outline:**



## 8.2 DC wire drawing





### 8.3 Label drawing

	MODEL: HK320 - 71PP AC INPUT: 100-240~,50-60Hz,5A SERIAL NO.: 0D000001
	<b>FAN CONTROLLED TFX12V POWER SUPPLY</b>
DC OUTPUT: +5V=14A(RE D),+12V=17A( Y E L L O W),+3.3V=8A(O R A N G E), -12V=0.3A(B L U E),+5VSB = 2.5A(P U R P L E), P G(G R A Y) OUTPUT WATTS: 220W ,+5V&+3.3V: 80W	
<b>CAUTION!</b>   Do not remove this cover under any circumstances.	
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Huntkey Hong Kong Development Co. Ltd.		File No. : EQS-731-1225
		Version : <b>01</b>
Prepare by	Check by	Approved by
<b>Tao Ma</b>	<b>DaYong Ding</b>	<b>Zhi Wu</b>
Date:2010-05-28		