

ATX12V PC Power Specifications

Model:HK650-51PP

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HK650-51PP Specification

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1.0 Input Characteristics(输入特性)

1.1 Input Voltage Range (输入电压范围)

85Vac to 264Vac, single phase.

交流输入电压范围为 85-264 伏, 单相。

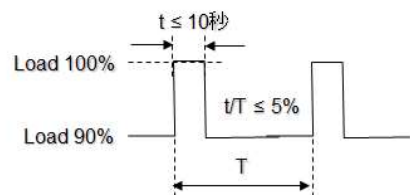
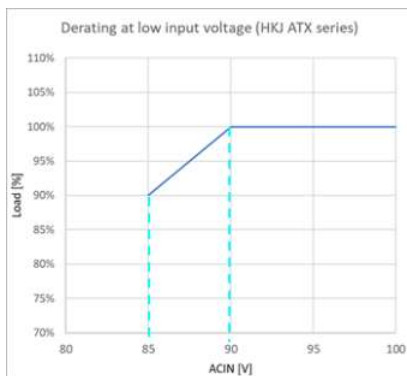
Table1. Input Voltage Range

表格 1.输入电压范围

RANGE	MINIMUM	NORMAL	MAXIMUM	UNITS
All Range	85	100~240	264	Vrms

(90% ~ 100% load at 85~90Vac input voltage, or 100% load within 10 seconds (duty 1/20))

(输入电压 85~90Vac 时负载率 90% ~ 100%, 或者 100%负载时 10 秒以内 (duty 1/20))



1.2 Input Frequency Range (输入频率范围)

Frequency Range: 50~60Hz

频率范围: 50 至 60 赫兹

1.3 Input current (输入电流)

Maximum steady state input current shall be less than 8.3A RMS at 100VAC and 3.3A RMS at 240VAC with maximum load at 25°C.

25 摄氏度下, 100 伏交流最大稳态输入电流应小于 8.3A, 240 伏交流应小于 3.3A。

1.4 Inrush current (浪涌电流)

Inrush current shall be less than 21A at 100VAC and 45A at 240AC at 25°C, by cold start condition.

25 摄氏度下, 冷态起机, 100 伏交流最大浪涌电流应小于 21A, 240 伏交流浪涌电流应小于 45A。

1.5 Power Efficiency (能效)

(1) Min 85% efficiency under 50% full load condition, input Voltage: 100Vac

在交流输入 100 伏、50%满载条件下: 效率最低为 85%。

Min 90% efficiency under 50% full load condition, input Voltage: 240Vac

在交流输入 240 伏、50%满载条件下: 效率最低为 90%。

Table2. Efficiency test loading

表格 2.效率测试负载

Load	5V	3.3V	12V1	12V2	12V3	-12V	5VSB	Efficiency [%] at 100VAC	Efficiency [%] at 240VAC
50%	6	6	6	6	6	0.15	1.5	85%	90%

1.6 Power factor (功率因数)

(1) PF is not less than 0.96 under 100% load with input voltage 100Vac.

在交流输入 100 伏、100%负载下功率因数应不低于 0.96。

(2) PF is not less than 0.92 under 100% load with input voltage 240Vac.

在交流输入 240 伏、100%负载下功率因数应不低于 0.92。

1.7 Standby Consumption (待机损耗)

AC input power should not exceed 1.5W under +5VSB /0.05A,at 230Vac/50Hz.

在230伏交流/50赫兹、+5伏辅助输出带负载0.05安培下，交流输入电源功率不超过1.5瓦特。

1.8 Harmonic Current (谐波电流)

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

谐波电流应符合IEC61000-3-2 D标准要求。

(2) Measurement shall be performed at At rated input/output

测量应在额定输入输出条件下测试。

2.0 Output Characteristics (输出特性)

2.1 Static output characteristics (静态输出特性)

Table3. Static output characteristics

表格 3.静态输出特性

输出电压	+3.3V	+5V	+12V1	+12V2	+12V3	-12V	+5VSB
Maximum current 最大电流	15A	15A	17.3A	17.3A	17.3A	0.3A	3A
	合计 115W		合计 520W				
	合计 550W						
Peak current (within 5s) 峰值电流(5秒以内)	18A	18A	20A	20A	20A	0.5A	3.5A
	合计 120W		合计 624W				
	合计 650W						
Minimum current 最小电流	0.3A	0.3A	0A	0A	0A	0A	0A
Output Voltage Tolerance 输出电压精度	±5%以下	±5%以下	±5%以下	±5%以下	±5%以下	±5%以下	±5%以下
Ripple 纹波电压	50mV	50mV	80mV	80mV	80mV	80mV	50mV

Ripple & Noise 纹波噪声	80mV	80mV	120mV	120mV	120mV	120mV	80mV
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At 25°C & 40°C

25摄氏度和40摄氏度下

(1) The total combined 3.3V&5V power shall not exceed 115W, the peak power shall not exceed 120W within 5 seconds.

3.3伏和5伏联合输出总功率不超过115瓦特, 5秒内的峰值功率不超过120瓦特。

(2) The total combined 12V1&12V2&12V3 power shall not exceed 520W, the peak power shall not exceed 624W within 5 seconds.

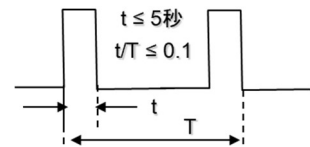
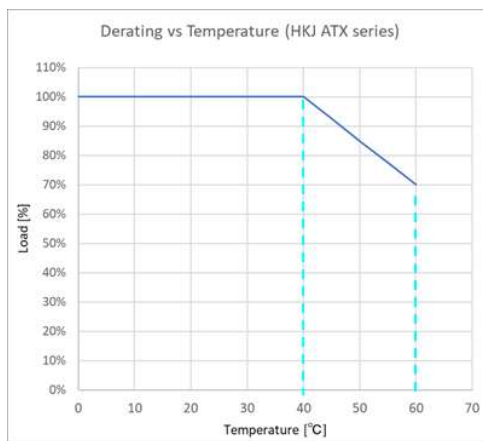
12V1、12V2和12V3联合输出总功率不超过520瓦特, 5秒内的峰值功率不超过624瓦特。

(3) The continuous output power shall not exceed 550W, the peak power shall not exceed 650W within 5 seconds.

电源的持续输出功率不应超过550瓦特, 5秒内的峰值功率不超过650瓦特。

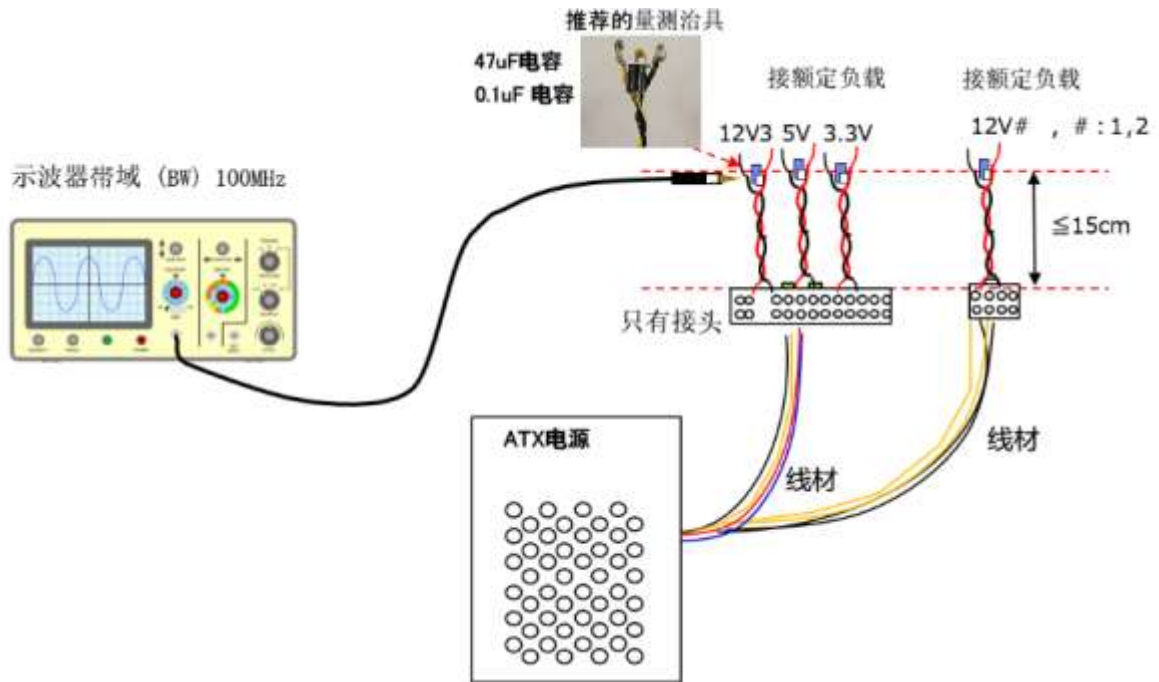
(4) Derating vs temperature and peak current.

温度降额曲线和峰值电流。



(5) A 0.1uF ceramic disk capacitor and 47uF aluminum capacitors should be put across output terminals within 15 CM during ripple & noise test. The oscilloscope bandwidth is set at 100 MHz and co-axial probe will be used to measure it.

在纹波噪声试验时, 输出端15厘米以内位置, 并联0.1微法拉陶瓷电容和47微法拉铝电容。示波器带宽设置为100兆赫, 并使用同轴探头进行测量。



2.2 Cross-load regulation (交叉负载调整率)

Table 4. Cross Regulation

表格 4. 交叉负载

Load	+5V Current [A]	+3.3V Current [A]	12V1 Current [A]	12V2 Current [A]	12V3 Current [A]	-12V Current [A]	+5VSB Current [A]
*Load1	0.3	0.3	0	0	0	0	0
*Load2	10	10	10	10	17.3	0.3	3
*Load3	10	10	10	17.3	10	0.3	3
*Load4	10	10	17.3	10	10	0.3	3
*Load5	15	12	11.6	11.6	11.6	0.3	3
*Load6	13.1	15	11.6	11.6	11.6	0.3	3
*Load7	1	2	14.45	14.45	14.45	0.3	3
*Load8 (half load)	6	6	6	6	6	0.15	1.5
*Load9 (full load)	12	12	12	12	12	0.3	3
*Load10	6	6	6	6	6	0.5	1.5
*Load11	12	12	12	12	12	0.5	3

2.3 Dynamic Load (动态负载)

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 0.5A/μs(-12V and +5VSB at 0.2A/μs). The square wave shall have a frequency 50Hz to 10KHz with a duty cycle of 10 to 90%.

以下动态负载应用于输出。波形应为升降斜率为0.5安每微秒的方波（-12伏和+5伏辅助输出为0.2安培每微秒）、电流方波频率从50赫兹到10千赫兹，占空比为10%到90%。

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

按照表格4的负载，输出电压不应超过表格2的规格限制。

Table5. Dynamic Load Step Sizes

表格 5.动态负载

OUTPUT	STEP LOAD	+12V1	+12V2	+12V3	+5V	+3.3V	-12V	+5VSB	TRANSIENT TOLERANCE(%)
+12V1	0.05~7.25A	N/A	0.3	0.3	0.3	0.3	0	0	+/-5
	7.5~17.3A	N/A	10	10	10	10	0.3	3	
+12V2	0.05~7.25A	0.3	N/A	0.3	0.3	0.3	0	0	+/-5
	7.5~17.3A	10	N/A	10	10	10	0.3	3	
+12V3	0.05~7.25A	0.3	0.3	N/A	0.3	0.3	0	0	+/-5
	7.5~17.3A	10	10	N/A	10	10	0.3	3	
+5V	0.3~4.5A	0.3	0.3	0.3	N/A	0.3	0	0	+/- 5
	10.5~15A	12	12	12	N/A	8	0.3	3	
+3.3V	1.0~4.0A	0.3	0.3	0.3	0.3	N/A	0	0	+/- 5
	10.5~15A	10	10	10	10	N/A	0.3	3	

(Adding external capacitor: 5V/6000uF, 12V1/6000uF, 12V2/6000uF, 12V3/6000uF, 3.3V/6000uF, -12V/350uF, 5Vaux/350uF)

(额外增加电容: 5伏/6000微法拉, 12伏1/6000微法拉, 12伏2/6000微法拉, 12伏3/6000微法拉, 3.3伏/6000微法拉, -12伏/350微法拉, 5伏辅助输出/350微法拉)

2.4 Capacitive Load (容性负载)

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.

电源应能在表2中规定的调节限值下通电和运行，直流输出端同时具有以下电容。

Table6. Output Capacitive Loads

表格6.输出容性负载

Output	Capacitive Load
+12V1	6000μF
+12V2	6000μF
+12V3	6000μF
+5V	6000μF
+3.3V	6000μF
-12V	350μF
+5VSB	350μF

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

电源应具有输出连接器和束线配置

3.0 Protection (保护)

3.1 Over Voltage Protection (过压保护)

+5V: 5.5 ~ 7.0V, +12V: 12.8 ~ 15.6V, +3.3V: 3.6 ~ 5.0V. +5VSB: 5.5~7.5V. The main output shall shut down and latch off.

5伏输出过压点5.5~7.0伏, 12伏输出过压点12.8~15.6伏, 3.3伏输出过压点3.6~5.0伏, 5伏SB输出过压点5.5~7.5伏。主输出关断并锁死。

3.2 Short Circuit Protection (短路保护)

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

+5伏输出、+12伏输出、-12伏输出、+3.3伏输出短路保护且锁死, 需PS_ON复位或市电重启才能开机。

3.3 Over Current Protection (过流保护)

Any output shall not exceed requirement of the table. Otherwise, the main output shall shut down and latch off.

输出不应超过下表的要求。否则, 电源主路应关闭且锁死。

Table7. Over Current Protection

表格7.过流保护

Output Voltage 输出电压	+3.3V	+5V	+12V1	+12V2	+12V3	-12V	+5VSB
OCP Range 过流保护范围	19 ~ 29A	19 ~ 29A	21 ~ 34A	21 ~ 34A	21 ~ 34A	NA	NA

3.4 Over Temperature Protection (过温保护)

The power supply should protect itself when OTP occur, the main output shall shut down and latch off.

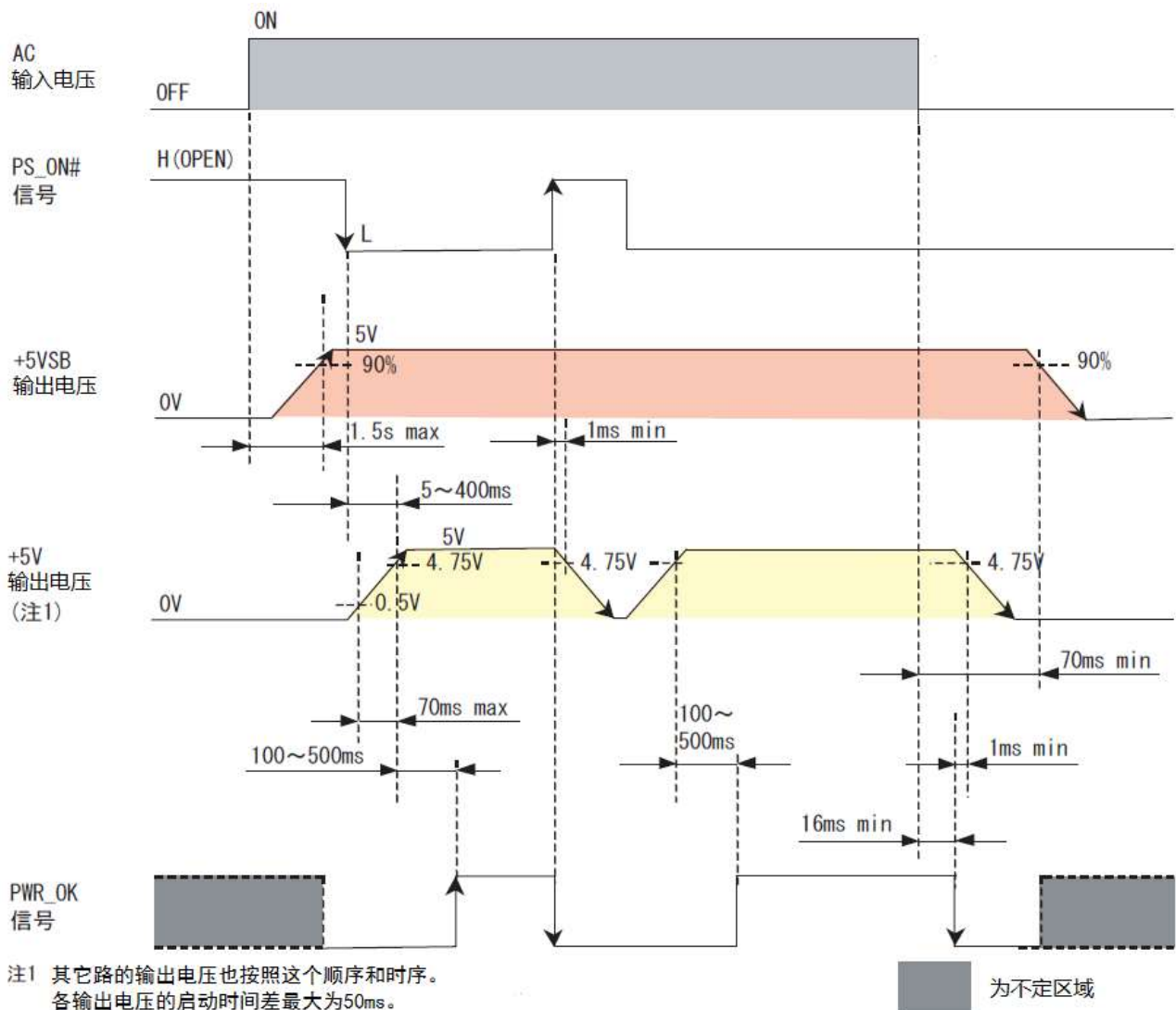
电源支持过温保护, 电源主路应关闭且锁死。

3.5 Reset after shutdown (关机后复位)

When the power supply latches into shutdown condition due to a fault on an output (over current, short circuit or over voltage), the protection latch shall reset within 60S after the fault has been removed or 30S after the ON/Off signal has switched state. Besides, the latch shall reset within 10 minutes when the 5VSB triggers over voltage protection.

当电源因输出故障(过电流、短路或过电压)而锁定到关机状态时, 保护锁应在故障消除60秒或开/关信号切换状态后30秒内复位。此外, 当5VSB触发过压保护后, 锁死状态应在10分钟内复位。

4.0 Time Sequence (时序)



4.1 Power-on time (开机时间)

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 at least 5ms but not greater than 400 ms.

开机时间定义为从PS_ON置低电平到输出电压达到正常电压范围内，且时间在5毫秒到400毫秒之间。

4.2 Rise time (上升时间)

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 70 ms.

输出电压需在70毫秒时间内从10%上升至正常电压范围内，且上升时间不能小于0.1ms。

4.3 PWR_OK delay (PG 延迟时间)

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

从3.3V和+5V输出电压达到正常范围起，电源需在100毫秒到500毫秒之间输出PWR_OK信号。

4.4 PWR_OK rise time (PG 上升时间)

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

PWR_OK信号上升时间(从电压10%到90%测量)应小于10毫秒。

4.5 AC loss to PWR_OK hold-up time (PG 保持时间)

The PWR_OK shall remain an up level at least 16msec after AC power is removed and the test condition:115V/60Hz or 230/50Hz, 70% full load.

在市电断开后, PWR_OK应保持至少16毫秒不掉电。测试条件: 115伏/60赫兹或230伏/50赫兹, 70%负载。

4.6. Power Fail Delay Time (掉电延迟时间)

The Power _Down warning signal at least 1msec shall have a power Good Signal change Low Voltage to the 3.3V or +5V falls below their regulation limit. Test condition:115V/60Hz or 230/50Hz, 70% full load.

在市电关机后, PWR_OK信号需在5V或3.3V电压掉出电压范围前掉电, 且间隔时间不少于1毫秒。测试条件: 115伏/60赫兹或230伏/50赫兹, 70%负载。

4.7 Power OK (PWR_OK 信号)

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:

电源会提供一个表示电源正常的信号, 即PWR_OK, 来控制系统逻辑, 在输出电压掉出范围会提前告警系统。PWR_OK信号的电气特性如下所示:

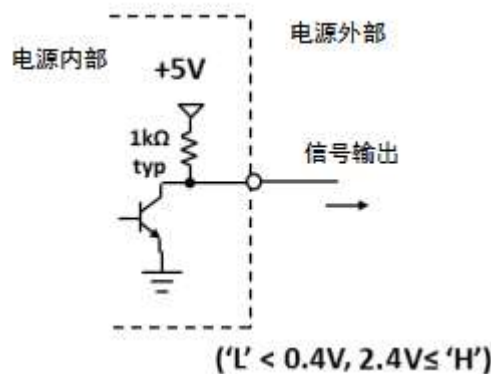


Table8. Power OK Signal Characteristics

表格8.PG信号特性

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

4.8 PS_ON (PS_ON 信号)

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:

PS_ON是一个低电压有效的+5V耐受TTL信号，允许主板远程控制电源。一旦向电源施加交流输入电压，电源内的内部上拉电阻器应提供TTL高输出逻辑电平。PS_ON信号的电气特性如下所示：

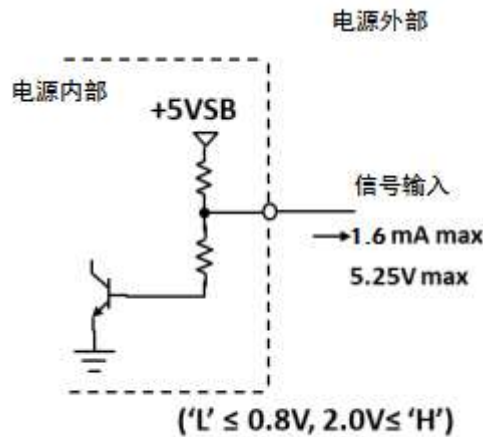


Table9. PS-ON Signal Characteristics
表格9.PS-ON信号特性

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 (5V 辅助输出)

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.

当电源输入额定工作范围内的电压时，PS_ON信号不能影响到+5V辅助电源输出。

6.0 Environment (环境)

6.1 Operating ambient (工作环境)

Air Temperature	0 to 40(60) degrees centigrade
Relative Humidity	10 to 90 percent, non-condensing

6.2 Shipping and Storage (储存和运输)

Air Temperature	-25 to 70 degrees centigrade
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Relative Humidity	10 to 95 percent, including condensation
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6.3 Altitude (海拔)

Operating to 5000 meters(16,404 ft)

工作在海拔5000m (16404英尺)

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

停止工作在海拔15250m (50000英尺)

6.4 Cooling (散热)

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

电源散热方式为强制风冷。

6.5 Fan speed control (风扇转速控制)

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

电源可以根据温度来调节风扇转速。

6.6 FAN C (风扇控制信号)

The FAN motor shall be forced to maximum speed when the FAN C input "L" ($\leq 0.8V$)

FAN C输入为"L" ($\leq 0.8V$) 时,强制性地使风扇马达用最高速旋转。

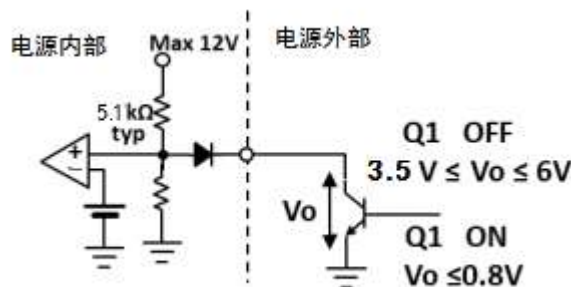


Table10. FAN_C Signal Characteristics

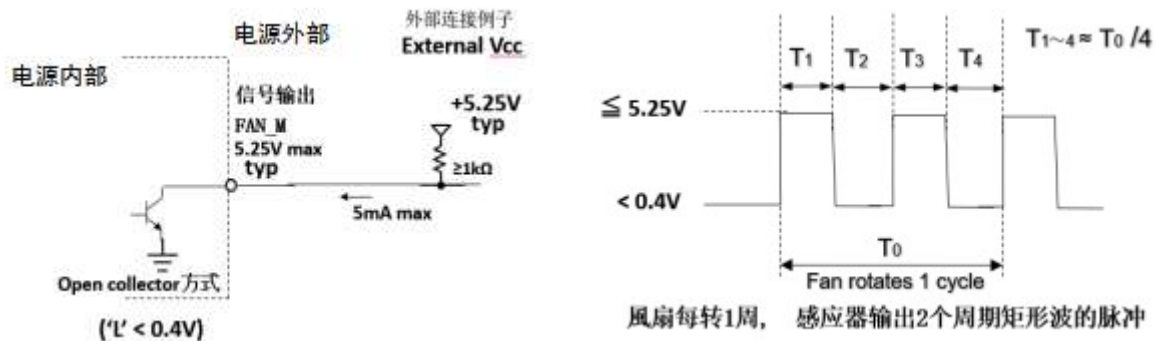
表格10. FAN_C信号特性

FAN_C Signal Characteristics		
Signal Description	Min	Max
Input Low Voltage	0.0V	0.8V
Input Low Current ($V_{in}=0.4V$)	-	-2.5mA
Input High Voltage	3.5V	6V
V_{IH} open circuit	-	6V

6.7 FAN M (风扇监视信号)

When the fan (motor) rotates 1 cycle, the FAN M shall output 2 cycles rectangular signal. When the fan fail to stop, the signal stops at "L" or "open" state.

风扇(马达)转动1周时,输出2周期的矩形状信号。风扇故障停止时,信号停止于"L"或者"OPEN"状态。



7.0 Safety and EMC (安全和电磁兼容)

7.1 SAFETY REQUIREMENTS AND Certify (安全要求和认证)

The power supply has been certified by CCC of China and comply with GB4943-2000 (IEC60950-1).

The CCC Safety mark shall appear on the product .

电源已通过GB4943-2000 (IEC60950-1)的CCC认证, 产品上应有CCC安全标志。

7.2 Conducted and Radiated Emissions (传导和辐射)

Conducted and radiated emissions of the power supply shall comply with the requirements of EN55022 Class B(Refer to Huntkey standard, test in the cabinet).

电源的传导和辐射发射干扰应符合EN55022 B级的要求 (参照航嘉标准, 放入机箱中测试) 。

7.3 ESD (静电)

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

电源的静电测试应符合IEC61000-4-2 4级的要求。

7.4 EFT (电快速瞬变脉冲群)

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

电源的电快速瞬变脉冲群测试应符合IEC61000-4-4 4级的要求。

7.5 Surge Susceptibility (抗浪涌干扰)

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

电源的抗浪涌干扰测试应符合IEC61000-4-5 3级的要求。

7.6 Hi-Pot (高压)

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

输入对地之间施加 交流1800V电压持续3.0s, 截止电流应小于10mA 。

7.7 Grounding Continuity Test (接地连续测试)

100mΩ MAX at 25.0A .

7.8 Ground Leakage Current (漏电流测试)

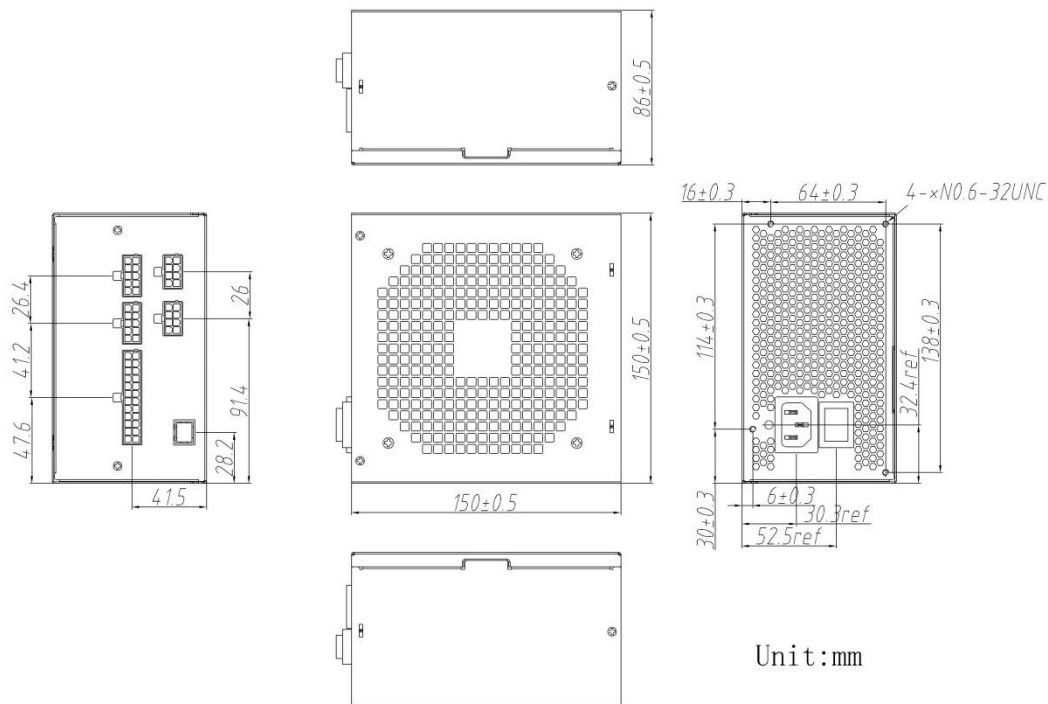
3.5mA MAX. at 264V 50Hz

7.9 Line Noise Immunity (线路抗扰度)

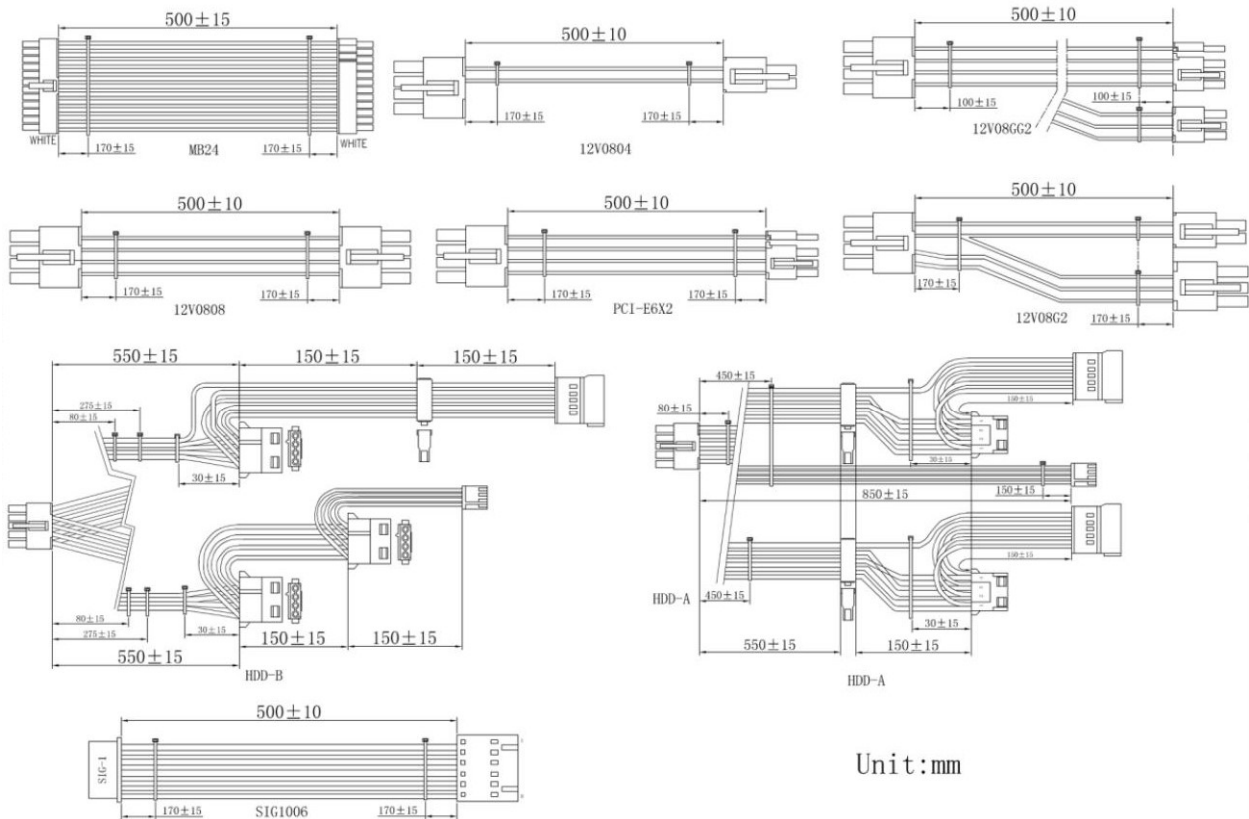
Measured by INS-410 No fluctuation of DC output or malfunction
 INS-410规定无输出的直流变动以及误工作现象

8.0 Mechanical (机械结构)

8.1 Mechanical outline (机械外观图)



8.2 DC wire drawing (线材外观图)



8.3 Label drawing (标贴)

Huntkey		SWITCHING POWER SUPPLY/开关电源						
型番/MODEL/型号 HK650-51PP								
AC入力/AC Input/交流输入	100-240V~, 50/60Hz, 8.3-3.3A							
出力電圧/DC Output/直流输出	+3.3V	+5V	-12V	+5VSB	+12V1	+12V2		+12V3
最大電流/Max Output Current/最大输出电流	15A	15A	0.3A	3.0A	17.3A	17.3A		17.3A
最大電力/Max Output Power/最大输出功率	115W		3.6W	15W	520W			
最大出力/Total Power/额定输出功率	550W							
警告! CAUTION!	大変危険ですので絶対に分解しないでください。 Do not remove this cover under any circumstances. 非专业人员请勿自行开启此盖 Tensions dangereuses contenues dans cette alimentation. Il est interdit de l'ouvrir ou d'essayer de la réparer par vous-même.							
Shenzhen Huntkey Electric Co., Ltd. 深圳市航嘉电源电气股份有限公司						Made In China(中国制造)		

Huntkey Hong Kong Development Co. Ltd.		File No.:
		Version: 01
Prepare by	Check by	Approved by
Li Yang	Cui Jing	Wang Benqiang
Date:2020-03-30		