

Specification For 60 Watts/ Switching Mode Power Supply

Product No./产品料号:P11-060246503R	Model No./产品型号:HKA06024025-7F
Customer/客户: 标准品	File No./文件编号:EQS-731-6193
Revision/版本: V01	Date/日期: 2021-08-16

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Prepared By : 拟 制:		Checked By : 审 核:		Approved By : 批 准:	
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客户承认书

SPECIFICATION FOR APPROVAL

CUSTOMER/ 客户: 标准品

CUSTOMER P.N./客户物料号: _____

MODEL NO./ 产品型号: HKA06024025-7F

APPROVAL NO./ 承认编号: _____

PREPARED DATE/拟定日期: 2021-08-16

CUSTOMER AUTHORIZED SIGNATURE/客户承认签核		

Please return to us one copy of "SPECIFICATION FOR APPROVAL" with you approved signature. // 客户确认签字，盖章后请回传一份承认书给我司。

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E. C. LIST/变更履历表

Rev. 版本	Description of Change/变更内容描述		Changed Date/日期	ECN No.
	Before/变更前	After/变更后		
V01	Original Release	---	2021-08-16	---

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1、Electrical Specification/电气特性

1.1.SCOPE/概述

The document details the electrical, mechanical and environmental specifications of a SMPS, the power supply provides 60W continuous output power .

资料详细描述了一款 60W(连续输出功率)开关电源的电气性, 结构性及环境等要求.

The power supply shall meet the RoHS requirements.

此款电源符合 RoHS 要求.

Description/描述：

- | | |
|----------------------------------------------------------|-------------------------------------------------------------------|
| <input type="checkbox"/> SMPS Adaptor(Wall mount)/插墙式适配器 | <input checked="" type="checkbox"/> SMPS Adaptor(Desk-top)/桌面型适配器 |
| <input type="checkbox"/> Open Frame/开放式结构 | <input type="checkbox"/> SMPS Unit (With Case)/带铁壳型 |
| <input type="checkbox"/> Others/其他 | |

1.2.Input Characteristics/输入特性

1.2.1. Input Voltage & Frequency/输入电压与频率

The range of input voltage is from 90Vac to 264Vac with a single phase.

输入电压范围：从 90Vac 到 264Vac, 单相输入.

	Minimum/最小	Rating/额定值	Maximum/最大
Input Voltage/输入电压	90Vac	100Vac~240Vac	264Vac
Input Frequency/输入频率	47Hz	60Hz/50Hz	63Hz

1.2.2. Input AC Current/输入交流电流

1.5Amax. @ 90Vac input & Full load/在 90Vac 输入和满载条件下最大 1.5A

1.2.3. Inrush Current (cold start)/浪涌电流(冷启动)

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. 2.1.

在 1. 2. 1 中所有输入条件下, 浪涌电流应小于关键器件的额定值(包括保险丝、桥整等浪涌限制元件)。

1.2.4. Average Efficiency /平均效率

While input 115Vac and 230Vac, the average efficiency is more than 89%.The test point is at 25%,50%,75% and 100% of max load respectively. And the efficiency shall be a minimum of 79% at 10% max load(warm up after 30 minutes).

在输入 115Vac 和 230Vac 条件下 平均效率不小于 89% 测试点分别是最大载的 25%,50%,75%和 100%。同时在 10%最大负载条件下, 效率不小于 79% (热机半小时后测试)。

1.2.5. No-Load Input Power Dissipation/输入空载功率损耗

While input 115Vac or 230Vac and the output is no load, the input power loss must be less than 0.15W.

在输入 115Vac/230Vac, 空载功耗小于 0.15W.

1.3.Output Characteristics/输出特性

1.3.1.Static Output Characteristics <Vo & R+N>/静态输出特性<输出&纹波+噪音>

Output	Rated Load/额定负载	Peak Load	Output Range	R+N	Remark

Rating	Min. Load	Max. Load		输出电压范围	纹波与噪声	备注
+24.0V	0A	2.5A		22.8V ~ 25.2V	240mVp-p	

Ripple & Noise: Tested by a oscilloscope using 20MHz bandwidth and the output is paralleled a 0.1uF ceramic capacitor and a 10uF electrolysis capacitor. (Under the input Voltage 100~240Vac)

纹波与噪声: 量测时示波器选用 20MHz 带宽限制,输出端要并联一颗 0.1uF 的陶瓷电容和一颗 10uF 的电解电容(输入电压 100~240Vac)

1.3.2.Line/ Load Regulation/线性/负载调整率

Output	Load Condition/负载条件		Line Regulation	Load Regulation	Remark
Rating	Min. Load	Max. Load	线性调整率	负载调整率	备注
+24.0V	0A	2.5A	± 2%	± 5%	

1.3.3.Turn – on Delay Time/开机延迟时间

3S max. @90Vac input & Full load/在 90Vac 输入和满载条件下最大 3S

1.3.4. Hold-up Time/关机维持时间

10mS min. @ Full load & 115Vac/60Hz input turn off at worst case
在 115Vac/60Hz 输入,满载同时最差情况下关机,最小 10mS

1.3.5.Rise Time/上升时间

50mS max. @ Full load/在满载条件下最大 50mS

1.3.6.Fall Time/下降时间

20mS max. @ Full load/在满载条件下最大 20mS

1.3.7.Output Overshoot / Undershoot/输出过冲/欠冲

10% max. When the power on or off/当电源开, 关机时最大 10%

1.3.8.Output Load Transient Response/输出负载瞬态响应

Output voltage is within 22.8-25.2V while the load step is from 50% to 100% of max load, R/S: 0.5A/uS, frequency: 100Hz and 5mS duration at 100% of max load.

输出电压在 22.8-25.2V 之间,负载变化: 从最大载的 50%到 100%,斜率: 0.5A/uS,频率: 100Hz, 100%负载持续时间为 5mS.

When the input voltage was 220Vac, output voltage is within 21.6-26.4V while the load step is from 1A to 5.5A, R/S: 0.5A/uS, frequency: 1Hz and 300mS duration at 5.5A load.

在 220V 输入,输出电压在 21.6-26.4V 之间,负载变化: 从 1A 到 5.5A,斜率: 0.5A/uS,频率: 1Hz, 5.5A 负载持续时间为 300mS.

1.4.Protection Requirements/保护要求

1.4.1.Over Current Protection/过流保护

OCP Point Limited: 3.2A~6.0A /保护点限制: 3.2A~6.0A

The output shall hiccup when the over current applied to the output, and shall be

Self-recovery when the fault condition is removed

当过电流时,输出将进入打嗝模式,当过流情况解除后,产品将会自动恢复正常

1.4.2.Short Circuit Protection/短路保护

The input power shall decrease when the output is short to GND; the power supply shall not damage, and shall be self-recovery when the fault condition is removed

当输出对地短路时,产品输入功率降低且不会损伤,当短路情况解除后,产品将会自动恢复正常

1.4.3.Over Voltage Protection/过压保护

The power supply shall be protected when the output is over voltage, and the power supply shall not be damaged

当输出过压时,产品保护且不会损伤

2、Environment Requirements/环境要求

2.1. Operating Temperature and Relative Humidity/操作温度和湿度要求

0°C to +40°C

10%RH to 90%RH (non-condensing) @Sea level shall below 5,000 meter

在海拔低于 5,000 米的条件下,低温操作下限为 0°C (无结冰环境);高温操作上限为

+40°C,相对湿度为 10%RH to 90%RH。

2.2. Storage Temperature and Relative Humidity/存储温度和湿度要求

-20°C to +85°C

5%RH to 95%RH (non-condensing) @ Sea level shall below 5,000 meter

在海拔低于 5,000 米的条件下,低温存储下限为-20°C (无结冰环境);高温存储上限为

+85°C,相对湿度为 5%RH to 95%RH。

3、Reliability Requirements/可靠性要求

3.1. Vibration/振动

5 to 500Hz sweep at a shift gears for 20 minute for each of the perpendicular axes X, Y, Z thereinto :acceleration frequency for 10 m2/s3 at 5~10HZ; acceleration frequency for 3 m2/s3 at 10~200HZ; acceleration frequency for 1 m2/s3 at 200~500HZ

扫描频率: 5 to 500Hz 随机振动, X, Y, Z 三垂直坐标轴向各振动 20 分钟,其中: 5~10HZ 频率范围的加速度频率为 10 m2/s3 , 10~200HZ 频率范围的加速度频率为 3 m2/s3 , 200~500HZ 频率范围的加速度频率为 1 m2/s3

3.2.Drop in/跌落

1Corner, 3 Edges, 6 Surfaces each once, Height: 100cm, on the cement plane

1角, 3棱, 6面各一次, 跌落高度: 100 厘米, 跌落到水泥地板上

3.3.MTBF Qualification/平均间隔故障时间估算

The MTBF shall be at least 50,000hours at 25°C, Full load and nominal input condition

平均间隔故障时间: 至少 50,000 小时, 25°C 环境及额定输入与满载条件下

3.4.The lifetime electrolyte capacitor/电解电容寿命

The lifetime of electrolyte capacitor shall be at least 43800hours at 30°C of 80%load and

115Vac/230Vac input condition

电解电容寿命至少 43800 小时,30℃环境及 115Vac/230Vac 输入与 80%负载条件下

3.5.Low Temperature Storage Test/低温存储

At -20℃, test of non-operated for 48 hours, the speed of temperature change is 1℃/min, (The distance at least 1~3cm between the products). No abnormality in electric and mechanical characteristic after 1.5 hours recovery at the room temperature.

非工作状态, 在-20℃环境下, 存储 48 小时, 温度变化速度为 1℃/min (每个产品保持 1~3cm 距离), 再放置室温 1.5 小时后, 正常工作, 无电性能故障

3.6.High Temperature Damp Storage Test/高温存储

At 85℃ and 95%RH, test of non-operated for 48 hours, the speed of temperature change is 1℃/min, (The distance at least 1~3cm between the products). No abnormality in electric and mechanical characteristic after 1.5 hours recovery at the room temperature.

非工作状态, 在 85℃环温和 95%湿度环境下, 存储 48 小时, 温度变化速度为 1℃/min(每个产品保持 1~3cm 距离)。然后放置室温 1.5 小时后, 正常工作, 无电性能故障

3.7.High / Low Temperature Thermal Shock Test/高低温冲击

The products test of non-operated with no-packing, storage the products 1 hour at +85℃, then storage the products 1 hour at -20℃. The temperature change time must less than 5 minutes. Total 12 cycles shall be applied. (The distance at least 1~3cm between the products).No abnormality in electric and mechanical characteristic after 1.5 hours recovery at the room temperature.

产品测试在无包装和未工作条件下, 放置+85℃环温存储 1 小时, 再在-20℃环温下存储 1 小时, 温度变化至少 5 次, 运行 12 个循环周期 (每个产品保持 1~3cm 距离)。然后放置室温 1.5 小时后, 正常工作, 无电性能故障

4、EMI/EMS Standards/EMI/EMS 标准

	项目 Item	等级/Rating	标准 Standards
1	传导干扰 Conducted interference	CLASS B	EN55032、FCC part15、GB 9254
2	辐射干扰 Radiated interference	CLASS B	EN55032、FCC part15、GB 9254
3	谐波电流 Harmonic Current	Class A	EN61000-3-2
4	电压闪烁 Voltage fluctuations and flicker	dmax 不大于 4% Pst 不大于 1	EN61000-3-3
5	SURGE	DM: ±4KV, CM:±4KV; Rating: B	EN61000-4-5 EN55035

6	EFT	±1kV; Rating: B, 2min	EN61000-4-4 EN55035
7	DIP	跌落至 0%U、时间 10ms、B 级要求 跌落至 70%U、时间 500ms、C 级要求 跌落至 0%U、时间 5000ms、C 级要求 Drop to 0%U、lasts 10ms、B rating Drop to 70%U、lasts 500ms、C rating Drop to 0%U、lasts 5000ms、C rating	EN61000-4-11 EN55035
8	ESD	Contact: 8KV /Air: 15KV , Rating: B	EN61000-4-2 EN55035
9	CS	Test Voltage: 4V, Rating: A	EN61000-4-6 EN55035
10	RS	Test Voltage: 4V/m, Rating: A	EN61000-4-3 EN55035

Performance Criteria Description:

A—— normal performance within limits specified by the manufacturer, requestor or purchaser.

B——temporary loss of function or degradation of performance which ceases after the disturbance Ceases, and from which the equipment under test recovers its normal performance, without operator Intervention.

C——temporary loss of function or degradation of performance, the correction of which requires Operator intervention.

D——loss of function or degradation of performance which is not recoverable, owing to damage to Hardware or software, or loss of data.

A: 在制造厂或委托方或客户规定的技术规范限值内性能正常;

B 功能暂时丧失或性能暂时降低, 但在骚扰停止后待测物能自行恢复, 无需操作者干预;

C 功能暂时丧失或性能暂时降低, 但需操作者干预才能恢复正常;

D 因硬件或软件损坏, 或数据丢失而造成不能够自行恢复至正常状态的功能降低或丧失。

5、Safety Standards/安规标准

5.1.Dielectric Strength(Hi-pot)/介电耐压强度(高压)

Primary to Secondary: 1500Vac / 3.5mA / 60 seconds

Or 2121Vdc / 3.5mA / 60 seconds

初级对次级: 1500Vac / 3.5mA/ 60 秒

或 2121Vdc / 3.5mA / 60 秒

5.2.Leakage Current/漏电流

0.25mAmax. at 264Vac / 50Hz input/在输入 264Vac/50Hz 的条件下最大 0.25mA

5.3.Insulation Resistance/绝缘阻抗

100MΩ min. @ primary to secondary add a 500Vdc test voltage

在初级与次级间加 500Vdc 进行测试,最小 100MΩ

5.4.Regulatory Standards/安规标准

音视频和信息技术类 IEC/UL/EN 62368、GB4943、IEC/UL/EN60950、IEC/UL/EN 60065

家电类 IEC/EN 60335、GB4706、UL1026, UL1083, UL982

医疗类 IEC/EN/UL 60601、GB9706

灯具类 IEC/EN61347、GB15910, UL8750

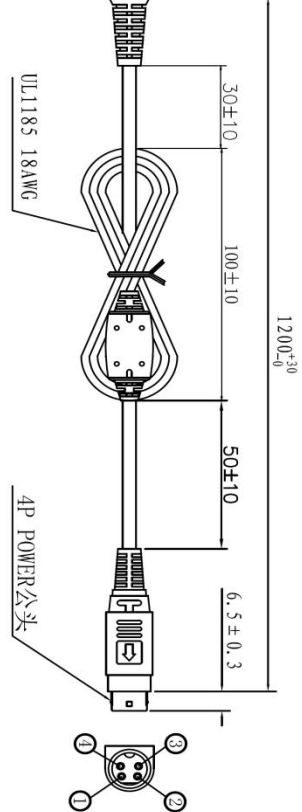
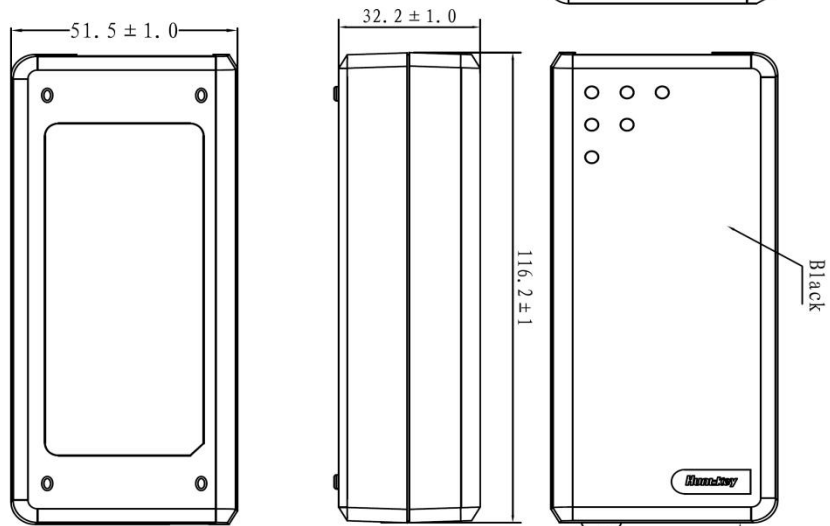
通用标准 IEC/EN 61558

Country	Mark	Country	Mark
<input checked="" type="checkbox"/> China 中国	CCC	<input checked="" type="checkbox"/> USA 美国	UL/FCC/DOE/CEC
<input checked="" type="checkbox"/> IEC 电工委员会	CB	<input checked="" type="checkbox"/> Japan 日本	PSE
<input checked="" type="checkbox"/> Europe 欧洲	CE/ERP/EMC	<input type="checkbox"/> Taiwan 台湾	BSMI
<input type="checkbox"/> South Korea 韩国	KC+KCC+MEPS	<input type="checkbox"/> India 印度	BIS
<input type="checkbox"/> Australia/New Zealand	RCM+GEMS+SAA+C-Tick	<input type="checkbox"/> Germany 德国	TUV
<input type="checkbox"/> Canada 加拿大	CSA+ICES+NRCAN	<input type="checkbox"/> Singapore 新加坡	PSB
<input type="checkbox"/> Argentina 阿根廷	IRAM-S Mark	<input type="checkbox"/> Russia 俄罗斯	EAC

6、Mach. Outline Drawing/外观图

外壳尺寸	116.2*51.5*32.2
外壳颜色	BLACK
DC 线类型	UL1185, VW-1, 80C, 300V, 18#
DC 线长度	1.2M
DC 头尺寸	4Pin 九件套
LED 颜色	BLUE
单体净重	**g

HKA06024025-7F



P端	电压	颜色	S端
①	(GND)	缠绕地线	-
②	(GND)	缠绕地线	-
③	24V	白色芯线	+
④	24V	白色芯线	+
		铁壳	

接线表

MARK		QTY	ECN NO.	EDITED	DATE	SIZE	REV	COLOR	SCALE
DRAWN						A4	1	black	/
CHKD			UNIT	mm		FILE NO.			
MFG			STDD			SHEET			
			APPD			1 OF 1			

Huntkey 航嘉

外观尺寸图

HKA06024025-7F

FORMAT 1

7、Label Drawing/标贴图

OS05120905-05C

技术要求:

1. 材质: 50#哑白PET, 表面过耐擦拭PET哑膜, 标贴供应商UL卡上要有贴纸材料的型号, 满足UL CCN号PGDQ2/8或者PGI12/8; 标贴印刷厂须在出货时的最小包装袋上标明厂名称或商标, UL证书号和标贴注册的型号, 材料及加工工艺需满足航嘉无卤要求。
2. 标贴需要符合以下擦拭标准: 先用一块蘸有清水的棉布擦拭15秒, 然后用一块蘸有汽油的棉布擦拭15秒, 标贴字迹和标志依然清晰, 标贴不能轻易被揭掉, 并且不出现卷边。
3. 黑底白字, 字迹清晰, 黑色色号: PANTONE 426C, 白色色号: PANTONE White C。
4. 单面背胶, 粘性良好:
 - 1) 粘着力以180度角, 300 mm / min的速度拉动 (使用自动标贴拉力实验机) 进行测试, 胶底粘着力应满足大于等于1.0kgf/25mm;
 - 2) 保持力: 1 KG/24H不脱落;
 - 3) 耐高温: 经过-40°C到80°C高温冲击和持续80°C(4H)高温无起泡、起翘等不良。
5. 标贴粘附物: 贴在塑胶下盖标贴粘附处。
6. 标贴粘附物: 贴时无毛刺, 颜色字体以封样为准。
7. 切边挺直, 无毛刺, 颜色字体以封样为准。
8. 编码规则: CODE-128, 字体为Arial Unicode Ms, 日期以供应商送货日为准。

供应商代码, S-其中的一个字母表示, 具体由航嘉标贴供应商根据航嘉制定的编码规则打印:

a. 机种名称: 60代表60W系列, B代表成品料号。

b. 客户代码: 按航嘉现有客户编码, 不变。

c. 制造年月日: 11代表2011年, 12代表2012年, 以此类推;

d. 制造月份 C代表12月, B代表11月, A代表10月, 1-9月用自然数字表示;

e. 3代表日, 1=1, 2=2, 3=3, 4=4, 5=5, 6=6, 7=7, 8=8, 9=9;

f. A=10, B=11, C=12, D=13, E=14, F=15, G=16, H=17, I=18, K=19, L=20, M=21, N=22, P=23, R=24, S=25, T=26, V=27, W=28, X=29, Y=30, Z=31。

g. 产品流水号: 依生产顺序编码, 日期变, 流水号从头部开始。

FORMATI

MARK	QTY	EON NO.	UNIT	EDITED DATE	FILE NO.	SIZE	REV	WEIGHT	SCALE
DRAWN	张仕雄	2021.08.10	mm	2021.08.10	A4	V01	试产		1:1
CHKD	刘宪利	2021.08.10	mm	2021.08.10					
MFG									

Huntkey 航嘉
ADAPTER电源适配器

MODEL/型号: HKA06024025-7F
INPUT/输入电压: 100-240V~50/60Hz, 1.5A
OUTPUT/输出电压: 24.0V±2.5%, 60.0W
CAN ICS-003(B)/NMB-003(B)

This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received,
including interference that may cause undesired operation.

Shenzhen Huntkey Electric Co., Ltd.
Huntkey Industrial Park, Xue-Xiang Village,
Banxue Road, Bantian, Shenzhen, Guangdong,
518129, P.R.China

深圳市航嘉驰源电气股份有限公司
中国制造

8、Package Drawing/包装示意图

尺寸范围 (mm)	公差
0.5-10	+0.5
10-100	+1.0
100-200	+1.5
200-500	+2.0
500以上	+3.0

打栈板方式：需交错咬合放置，需要采用围膜、打角纸、打包带进行保护，使货物包装与托盘成为一个整体。堆高不高于6层

放入托盘
↓
1PCS成品

每层20PCS,
共3层

采用“工”字型封箱

变更日期	标记	处数	变更描述
2014.07.01			变更印刷内容：去掉“中国地名商标”，变更地址名称，修改型号等行间距。

Huntkey 航嘉		MATERIEL NAME		外箱		MATERIAL	
SHEET	5 OF 5	MATERIEL No.	365-60601000J0	FILE NAME		HK404812040-70	(续产)
UNIT	mm	SCALE	/	DATE	2014.07.01	REV	2
DESIGNED	范娜	CHECKED	徐加红	CHECKED	喻楠辰	APPROVED	姚雪峰
FILE No.							