

Industrial Power Specification

Model: HKI350-120NB

File No.: EQS-731-5444

Prepared by: Xinjia Zhang

Checked by: Weijiang Wang

Approved by: BengQiang Wang

Issue date: 2020-12-02

目录 TABLE OF CONTENTS

1. 输入性能 INPUT CHARACTER	5
1.1 标称输入电压范围 Nameplate Input Voltage Range	5
1.2 输入工作电压范围 Input Voltage Range	5
1.3 最高极限输入电压 High-Point Input Voltage Range	5
1.4 交流输入频率 Input Frequency Range	5
1.5 输入电流 Input Current	5
1.6 输入冲击电流 Inrush Current	5
1.7 功率因数 Power Factor	5
1.8 谐波电流 Harmonic Current	5
2. 输出性能 OUTPUT CHARACTER	5
2.1 输出电压范围 Output voltage range	5
2.2 额定电流 Output Rated Current	6
2.3 电压调整率 Voltage Regulation	6
2.4 负载调整率 Load Regulation	6
2.5 输出纹波与杂讯 Ripple / Noise	6
2.6 容性负载能力 Capacitive load	6
2.7 整机效率 Power Efficiency	6
2.8 开机输出延时 Output Delay Time	6
2.9 输出电压上升时间 Output Voltage Rise Time	6
2.10 开关机过冲 ON/Off Overshoot	6
2.11 保持时间 Hold-Up Time	6
2.12 动态响应恢复时间 Dynamic Response Recovery Time	6
2.13 动态响应过冲 Dynamic Response Overshoot	6
2.14 待机功耗 Standby Consumption	6
2.15 均流 Currenting-sharing	6
3. 保护功能 PROTECTION	7
3.1 输出过流保护 Output Over Current Protection	7
3.2 短路保护 Short Circuit Protection	7
3.3 过压保护 Over Voltage Protection	8
3.4 输入欠压保护 Input Under Voltage Protection	8
3.5 过温保护 Over Temperature Protection	8
3.6 特性和功能 Speciality and Function	8
4. 安规要求 SAFETY REQUIREMENTS	9
5. 电磁兼容性 EMC	10
6. 环境适应性 ENVIRONMENT ADAPTABILITY	10
6.1 环境条件 Environment Condition	11
6.2 可靠性要求 Life Test	11
6.3 老化要求 Aging Requirements	11
6.4 震动 Vibration	11
7. 电源结构规格 POWRE MECHANICAL SPECIFICATION	11
7.1 电源板的大小 Power Board Size	12
8. 包装/运输 PACKAGING/TRANSPORTS	13

8.1 包装图 Packaging Size	-----13
8.2 产品标签图 Label Drawing	-----14
8.3 运输 Transport	-----14
9. 样机图片 SAMPLE FIGURES	-----15

HKI350-120NB Functional Specification

1. 输入性能 INPUT CHARACTER:

项目 Item	最小值 Min	典型值 Normal	最大值 Max	单位 Units	测试条件 Conditions
1.1 标称输入电压范围 Nameplate Input Voltage Range	100	100-120V	120	VAC	铭牌标称电压, 在此电压范围内进行安规认证 For safety certify
	200	200-240V	240		
1.2 输入工作电压范围 Input Voltage Range	90	115	132	VAC	正常工作, 通过切换开关选择 Normal operation, select by switching switches
	180	230	264		
1.3 最高极限输入电压 High-Point Input Voltage Range	-	-	280	VAC	在此输入条件下可以不工作, 但不能损坏 Maybe not operation, must no any damage
1.4 交流输入频率 Input Frequency Range	47	50/60	63	Hz	正常工作 Normal operation
1.5 输入电流 Input Current	-	7.0	-	A	115Vac 输入/额定负载 115Vac Input /full load
	-	3.5	-		230Vac 输入/额定负载 230Vac Input /full load
1.6 输入冲击电流 Inrush Current	-	-	65	A	230V 输入冷起机 At 25°C cold start Input 230Vac Note (1)
1.7 功率因数 Power Factor	-	-	-	N/A	115/230Vac 输入/额定负载 115/230Vac Input /full load
1.8 谐波电流 Harmonic Current:	-	-	-	N/A	230V 输入/额定负载 230Vac Input /full load

Note(1) 电源的浪涌电流应该不超过标准元件的规格值 (包括整流桥, 保险丝及浪涌限制元件)。

Power supply inrush current shall be less than the ratings of its critical components (including rectifier bridge, fuses, and surge limiting devices) under all conditions of line voltage of Sections .

2. 输出性能 OUTPUT CHARACTER

2.1 单路输出 Single output:

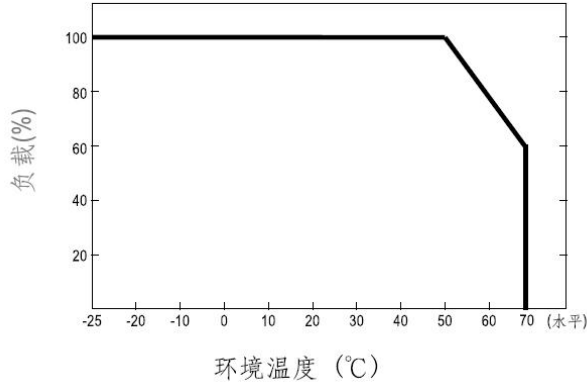
项目 Item	最小值 Min	典型值 Normal	最大值 Max	单位 Units	测试条件 Conditions
2.1 输出电压范围 Output voltage range	11.4	12	12.6	Vdc	输入 100-120&200-240Vac/空载-满载 测试点--PCB 板端 Input 100-120&200-240Vac/No

						load~Full load Test point--output on PCB Note(2)
2.2	输出额定电流 Output Rated Current		30		A	输入 100-120&200-240Vac/满载 Input 100-120&200-240Vac / Full load
2.3	电压调整率 Voltage Regulation			±2	%	输入 100-120&200-240Vac/满载 Input 100-120&200-240Vac / Full load
2.4	负载调整率 Load Regulation			±2	%	输入 230Vac/满载 Input 230Vac / Full load
2.5	输出纹波/杂讯 Ripple / Noise Note (3)			50	mV	输入 100-120&200-240Vac/空载-满载 Input 100-120&200-240Vac/No load~Full load
2.6	容性负载能力 Capacitive load			60000	uF	输入 115/230VAC、满载 Input 230Vac / Full load
2.7	整机效率 Power Efficiency	86			%	输入 230Vac、满载、常温下 Input 230Vac / Full load/25°C
		-	-	-	%	输入 110Vac、额定负载、常温下 Input 110Vac / Full load/25°C
2.8	开机输出延时 Output Delay Time		-	3.0	S	输入 230VAC、满载 Input 230Vac / Full load/25°C
2.9	输出电压上升时间 Output Voltage Rise Time	0.1		200	mS	输入 115/230VAC、满载 Input 230Vac / Full load
2.10	开关机过冲 ON/Off Overshoot			±5	%	输入 100-120&200-240Vac、满载 Input 100-120&200-240Vac / Full load
2.11	保持时间 Hold-Up Time	12			mS	输入 115VAC、满载 Input 115Vac / Full load
		16				输入 230VAC、满载 Input 230Vac / Full load
2.12	动态响应恢复时间 Dynamic Response Recovery Time		<1		mS	负载变化, 电流变化率 0.1A/us, 周期 4ms 25%~50%~25% 或 50%~75%~50% Full load, Current change rate 0.1A/us, Period 4ms
2.13	动态响应过冲 Dynamic Response Overshoot			±5	%	输入 100-120&200-240VAC Input 100-120&200-240Vac
2.14	待机功耗 Standby Consumption			1.0	W	输入 230VAC 时, 电源功耗不超 1.0W AC input power should not exceed 1.0W under no load and 230Vac voltage.

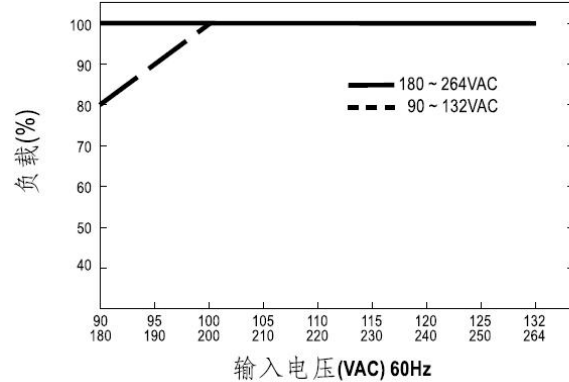
Note(2) 50 度条件下连续工作不超过 350W, 70 度条件下连续工作不超过 210W, 50 度条件下每增减一度, 减额 2%的额定负载。

- 1, at 50°C The continuous output power shall not exceed 350W.
- 2, at 70°C The continuous output power shall not exceed 210W.
- 3, The output power shall derating 2% per degrade at ambitious higher than 50°C.

■ 减额曲线



■ 静态特性曲线



Note(3) 纹波和噪声测试方法: 使用一条 12cm 双绞线, 同时终端要并联 0.1uF 陶瓷电容和 10uF 电解电容, 在 20MHZ 带宽下进行量测, 在 100-120&200-240Vac, 温度 -20°C ~ +70°C 条件下测量。(纹波在不同负载下的一致性 & 稳定性, 具体参照航嘉工业电源测试标准)

Ripple & Noise testing method: A 0.1uF CERAMIC capacitors and 10uF electrolytic capacitors should be put across output terminals during ripple & noise test. The oscilloscope bandwidth is set at 20 MHz and a 12cm twisted-pair will be used to measure it, between 100-120&200-240Vac, and Between negative 20°C and positive 70°C temperature. (The Ripple on different condition should be in the limits referencing to Industrial power test specification)

3. 保护功能 PROTECTION

- 1、电源因输入欠压、输出过流、短路、过温时会自动保护, 当故障排除后, 电源会自动恢复工作。

The power supply should protect itself when OCP/OTP or short circuit、input brown out occur, and it will recover when the breakdown's removed.

- 2、电源因输出过压时会自动锁死保护, 当切断输入、重新上电后, 电源会恢复工作。

The power supply should protect itself when OVP occur, and it will recover when switching off the input to re-power.

3.1 输出过流保护 Output Over Current Protection

当输出电源+12V, 输出电流达到 33A---45A, 电源将进入打嗝保护状态, 当故障排除后, 电源会自动恢复工作。

When the output current of output power +12 V is up to 33A---45A, power will enter hiccup protection status, and it will recover when the breakdown's removed.

3.2 短路保护 Short Circuit Protection

当输出端短路时电源不能被损坏、不能起火燃烧, 短路消除后能自动恢复。

When output is short, the power supply don't be damaged, don't burst into flames and it will recover when such condition's removed.

3.3 过压保护 Over Voltage Protection

测试项	过压值	保护模式
-----	-----	------

Sense Level	Over Voltage	Protection Mode
+12V	13.8V---16.2V	锁死保护 Lock Protection

电源在输出为 13.8V 到 16.2V 之间保护, 去掉故障重启电源后恢复。

The power supply should protect itself when the output in 13.8V-16.2V, and it will recover when switching off the input to re-power.

3.4 输入欠压保护 Input Under Voltage Protection

交流输入欠压保护点: $\leq 75\text{Vac} \& 150\text{Vac}$, 欠压保护恢复点: $\geq 85\text{Vac} \& 170\text{Vac}$ 。

The power supply should protect itself when the input brown out Occur($\leq 75\text{Vac} \& 150\text{Vac}$), and it will recover when the breakdown's removed($\geq 85\text{Vac} \& 170\text{Vac}$).

Note(4) 参考 IC 方案 Refer to the ic scheme

3.5 过温保护 Over Temperature Protection

电源支持过温保护, 自恢复, 过温保护点确保所有器件温度规格不超标。

The power supply should protect itself when OTP occur, and it will recover when the breakdown's removed. The OTP points ensure all device temperature specifications.

4. 安规要求 SAFETY REQUIREMENTS AND CERTIFY

此款电源设计符合下列安全规格:

1 满足 UL62368-1 标准要求. 有 UL62368-1 认证证书, 且产品标有 UL 标识。

(1) Safety standardization UL62368-1 .

(2) The power supply has been certified by UL62368-1.

(3) The UL Safety mark shall appear on the product.

项目 Item	等级 Grade	标准 Standard (或测试条件 Test Conditions)
输入对输出 Input to output	3000Vac/50Hz	持续 1 分钟, 无击穿, 无飞弧现象, 漏电流 $<10\text{mA}$ 。(测试时断开放电管) One minute, no breakdown, no flight arc, Leak current $<10\text{mA}$. (open the discharge tube during tests)
输入对地 Input to earth	2000Vac/50Hz	持续 1 分钟, 无击穿, 无飞弧现象, 漏电流 $<10\text{mA}$ 。(测试时断开放电管) One minute, no breakdown, no flight arc, Leak current $<10\text{mA}$. (open the discharge tube during tests)
输出对地 Output to earth	500Vac/50Hz	持续 1 分钟, 无击穿, 无飞弧现象, 漏电流 $<10\text{mA}$ 。(测试时断开放电管) One minute, no breakdown, no flight arc, Leak current $<10\text{mA}$. (open the discharge tube during tests)
绝缘电阻 Insulating resistance	10M Ω	常温常压下, 相对湿度为 90%, 试验电压为直流 500V 时, 整流器主电路的交流部分和直流部分对地, 以及交流部分对直流部分的绝缘电阻均不低于 10M Ω . Measure voltage 500VDC
漏电流 Leak current	Class I: $\leq 3.5\text{mA}$	输入 264VAC/60Hz Input 264Va/60Hz

2: 结构安全标准符合 EN60950, UL62368 GB4943 ; Mechanical Safety refer to EN60950, UL62368 GB4943;

3: IP 防护等级 IP20; Degrees of protection provided by closure IP20;

4: 工作海拔要求 5000m; Operating to 5000 meters(10,000 ft);

5. 电磁兼容性 EMC

项目 Item	指标要求 Index requirements	标准 Standard
传导干扰(CE)	N/A	EN55032 Class B. 6dB Margin Note (6)
辐射干扰(RE)	N/A	EN55032 Class B. 6dB Margin
静电抗扰(ESD)	空气放电 Air±15KV	IEC61000-4-2 Category B
	接触放电 Indirect Contact±8KV	IEC61000-4-2 Category B
快速瞬间变脉冲群(EFT/B)	2KV 5/50 Tr/Th Ns, 5KHz 重复率	IEC61000-4-4 Category B
浪涌 (SURGE)	交流输入端口时, 线对线 L-N±2kV, 放电电阻 2Ω、线对地 L&N-P±4kV, 8/20(1.2/50)us 波	IEC61000-4-5 Category B
交流端口 EFT	2kV	IEC61000-4-4 Category B
谐波电流	N/A	IEC6100-3-2
电压波动和闪烁	Pst 值不大于 1.0; P1t 值不大于 0.65; 相对稳态电压变化 dc 不超过 3.3%; 最大相对电压变化 dmax 不超过 4%; 相对电压变化 d(t)值超过 3.3%的时间不大于 500mS。	IEC6100-3-3
电压跌落和短时中断 (DIP)		IEC6100-4-11 测试条件 AC220V

性能判据 A (连续现象)

在干扰过程中, 直流输出范围应与 在正常服务条件一致: DC 输出电压的波动应在 ±10%内;

干扰过程中或结束后, 被测设备运行时不应有告警, 错误告警指示 (电源故障、保护故障等) 和错误显示。

性能判据 B (瞬变现象)

- 在试验过程中, 直流输出端的电压不应超出最大值;
- 在干扰过程中出现的波峰群应忽视;
- 干扰结束后, 被测设备运行时不应有告警, 错误告警指示 (电源故障、保护故障等) 和错误显示;
- 在干扰结束后, 应自动恢复到正常性能。

性能判据 C (中断)

功能的暂时丧失是允许的, 所规定的功能是可自动恢复的或能被操作者恢复, 或被正常的后来的运行恢复。

性能判据 D (抵抗性)

设备应承受测试没有损坏或其它干扰 (如软件损坏或故障保护设备的误操作), 而且在瞬变电磁现象结束后适当地在规定界限内运行。(不要求当测试进行时适当运行)。干扰可以造成保险丝或其它规定设备的动作, 而不得不在正常运行恢复前替换或复位。

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.

Note (6) 所有的 EMC 测试需在金属铁板上测试。(长*宽*高=600mm*400mm*10mm)

All of the EMC tests shall be under on aluminium sheet.(length*width*height=600mm*400mm*10mm)

6. 环境适应性 ENVIRONMENT ADAPTABILITY

6.1 环境条件 Environment Condition

项目 Item	最小值 Min	典型值 Normal	最大值 Max	单位 Units	备注 Note
工作温度 Operation Temperature	-25	25	70	°C	-25°C冷态可启机, 配合系统满足正常工作要求。70°C为电源环境温度。 Turn on at -25°C,the system ambient temperature is 70°C.
储存温度 Storage Temperature	-40	25	85	°C	
工作湿度 Operation Humidity	5	--	85	%	无冷凝 no condensation
储存湿度 Storage Humidity	5	--	95	%	无冷凝 no condensation
大气压力 Atmospheric Pressure	86	--	106	KPa	
散热方式 Emitting Heat Mode	-				

6.2 电源寿命测试 Life Test

MTBF \geq 50.12K hrs

电源环境温度 45°C 及额定输入与满载条件下, 电源寿命至少 43800Hours。(5 年)

The power life time shall be at least 43800Hours, when the ambient temperature is 45°C at full load.

6.3 老化要求 Aging Requirement

电源老化时间参考航嘉内部产品老化时间升降流程作业。(文件编号:Q01-751-25-23)

老化条件: 额定电压输入, 80%满载, 45-/+5°C.(files:Q01-751-25-23)

The Aging time refers to HUNTKEY criterion.

Aging condition; 230Vac, 80% full load 45-/+5°C.

6.4 震动 Vibration

10~500HZ, 5G 10 分钟/周期, X、Y、Z 轴各 60 分钟。(单台机子)

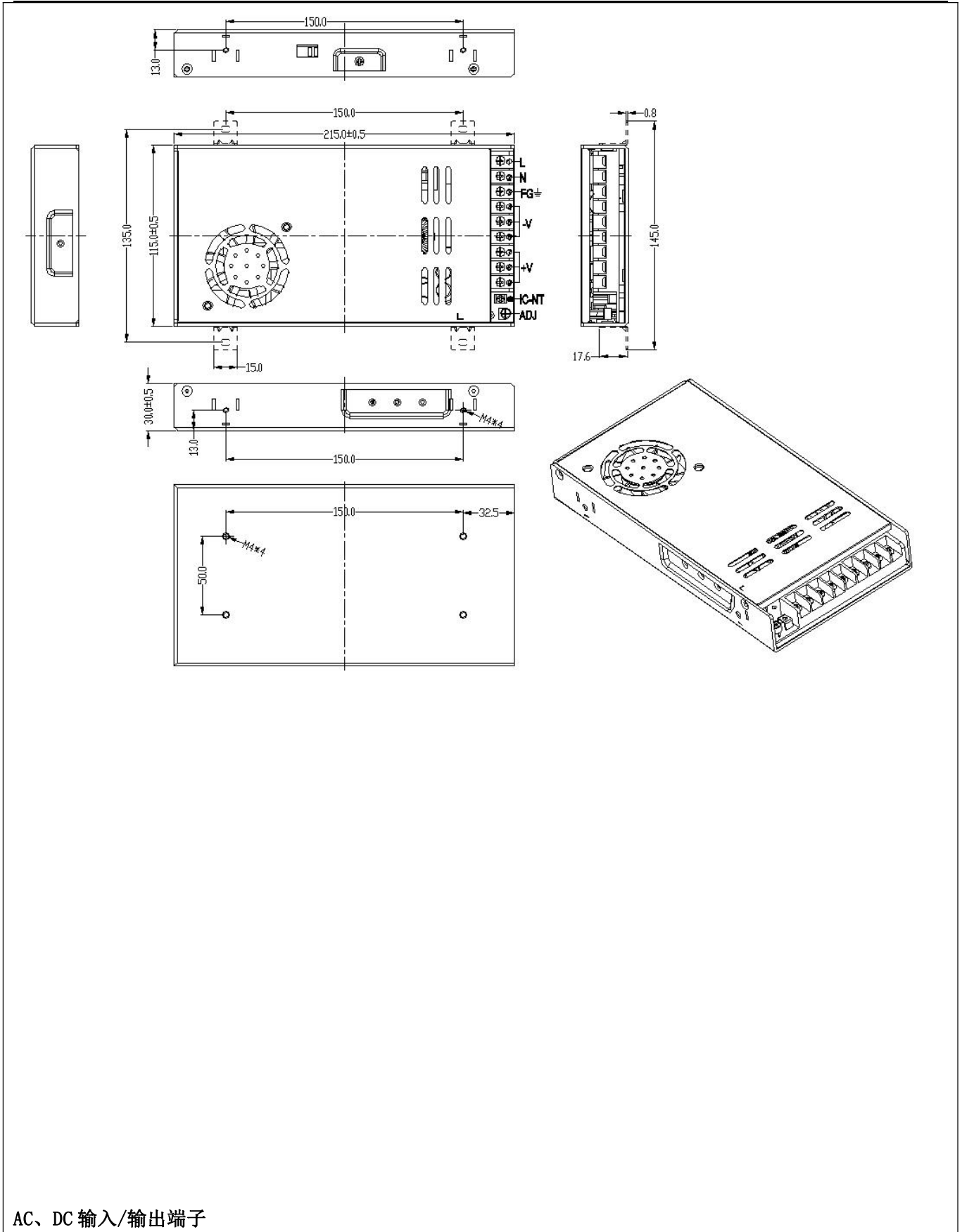
Between 10HZ and 500HZ, 5G 10 minutes per cycle, 60 minutes at per X、Y、Z directions.(1 set)

7. 电源结构规格 POWRE MECHANICAL SPECIFICATION

7.1 电源板的大小 Power Board Size (unit :mm)

外壳尺寸 L*W=215+/-0.5mm *115+/-0.5mm , H \leq 30mm, PCB 以上元件含 PCB 高度 \leq 23mm。

Ensure size L*W=215+/-0.5mm *115+/-0.5mm , H \leq 30mm, the high of component including pcb \leq 23mm.



DIM	TOL
0-50	± 0.1
50-100	± 0.2
100-200	± 0.3
>200	± 0.5
ANG	± 1°

技术要求:

1. 塑胶材料为PA66, 94V-0黑色, 端子材料为黄铜镀锡4-6u。
2. 螺丝M4, 钢镀镍。
3. 工作温度为: -40°C ~ +105°C
4. 电气参数: 300V/20A。
5. 接线扭力: 1. 2Nm。
6. 耐压: AC2000V/60S
7. 此种端子连接器采用焊接方式与PCB连接, 波峰焊接 260° C/5s, 2次共10s, 手工烙铁焊接350° C/10s
8. 其他要求参照供应商规格书执行

P: PIN 间距 9. 5mm
 N: PIN 数量 7pcs
 L: N * P + 1. 8

MARK		QTY	ECN NO.	EDITED	DATE	A4	01	FINISH	
DRAWN		徐朝曦	20180718	UNIT	mm	FILE NO.	020-731-02488	MATERIAL	
CHKD		王卫光	20180718	STDD				SIZE	
MFG			APPD	王本强	20180718			REV	
								WEIGHT	
								SCALE	
								SHEET	
								1 OF 1	

Huntkey 航嘉	
7PIN BARRIER TERMINAL BLOCK	
共用件 174-11P00700R0	

FORMAT 1

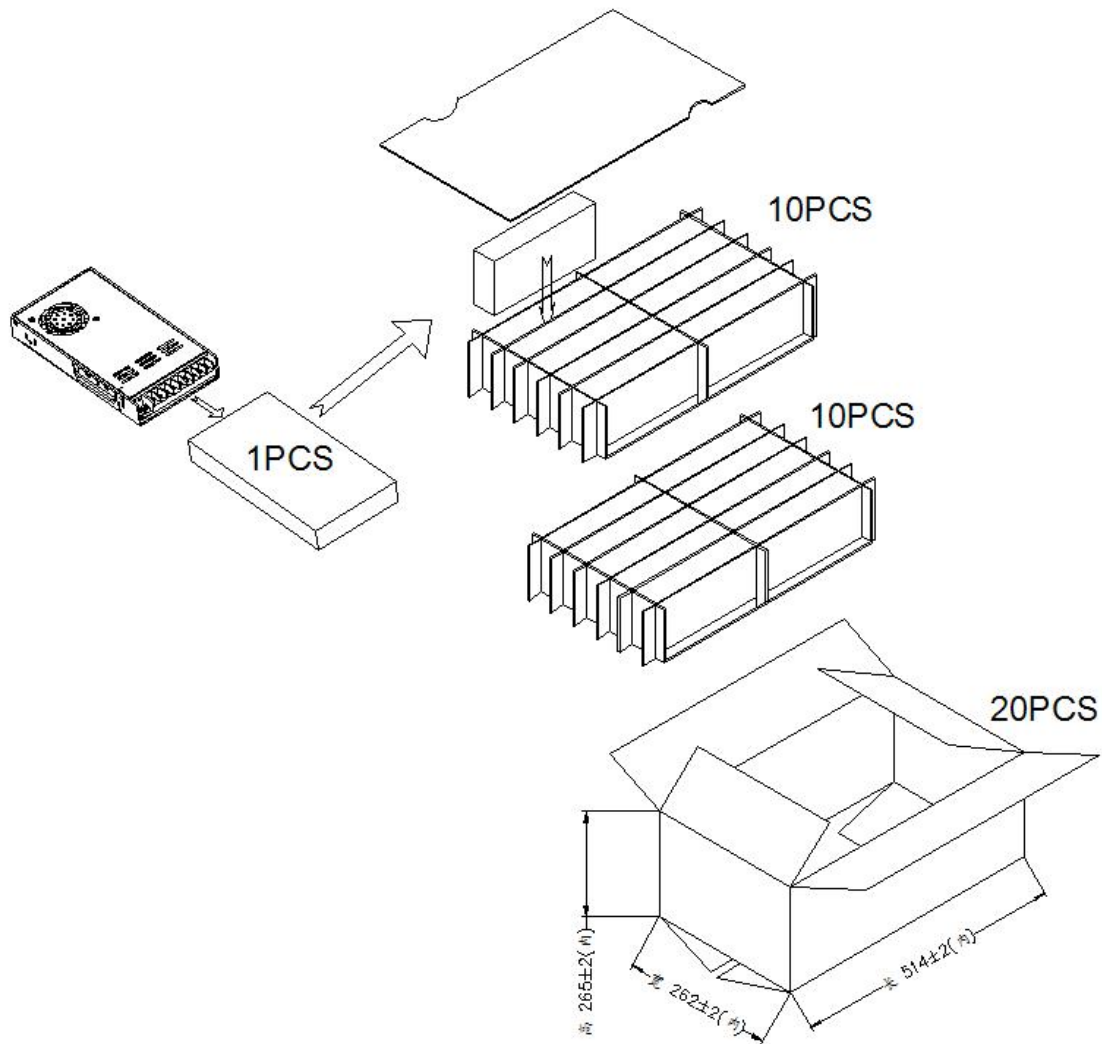
8. 包装/运输 PACKAGING/TRANSPORTS

8.1 包装图 Packaging Size.

20pcs

单机用纸盒包装, 然后放入瓦楞纸箱并用纸板隔离。

One set packed by a boxes Then take the unit into carton and isolated by chipboard by chipboard.



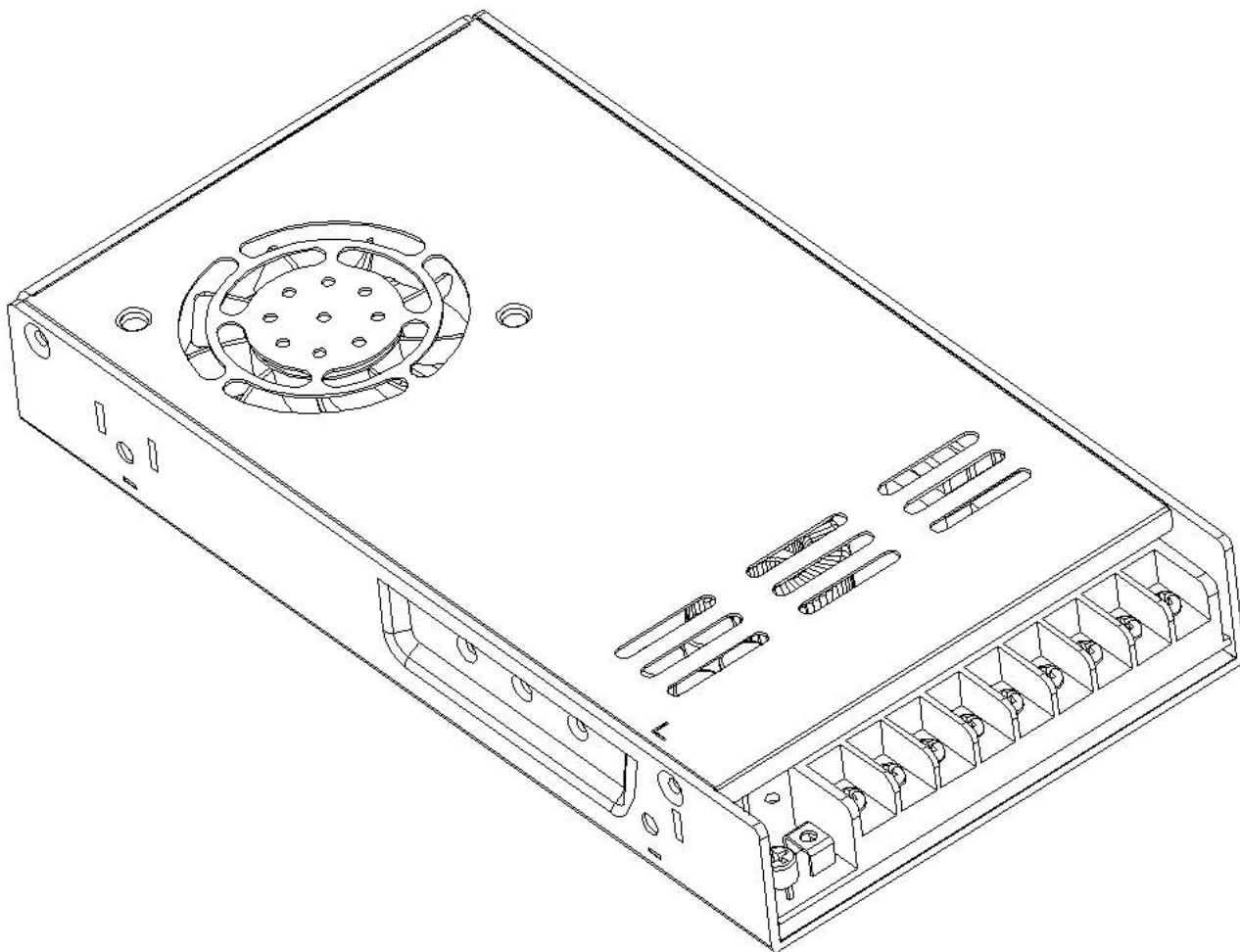
8.2 产品标签图 Label Drawing



8.3 运输 Transports

包装储运图示标志有: 向上、怕湿、小心轻放、堆码极限等标志 (标志应清楚、整齐、耐久)。
 Upwards, Isolated to water, Take care to put symbol in the carton. (The label should be clear, tidy, durable)

9. 样机图片 Sample Figures



Huntkey Hong Kong Development Co.Ltd.		File No.:
		Version: V02
Prepare by	Check by	Approved by
Xinjia Zhang	Weijiang Wang	Bengqiang Wang
Date:	2020-12-02	