



# 深圳市欧凯科技有限公司

## Shenzhen Okey Technology Co., Limited

### SPECIFICATION FOR APPROVAL

**Customer spec:** Input 100-240V AC, 50/60HZ, 5V2000mA output

**Customer part No:** SGBotic Pte Ltd/ 5V2000mA

**Okeytech part No:** OK-W05-2000EU AC-DC power adapter, 0.45A Max input current

**Samples No:** S20141215      **Issuing date:** 2014-12-15

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<b>Shenzhen Okey Technology Co., Limited</b> <b>深圳市欧凯科技有限公司</b>	Switching mode power supply Specification ( CLASSII )	
	<b>Okeytech P/N</b>	<b>Customer P/N</b>
	OK-W05-2000	

**1 General**.....

**2 Quoted criterion**.....

**3 Electrical characteristics**.....

**4 Input characteristics**.....

**5 Output characteristics**.....

**6 Reliability items**.....

**7 Mechanical characteristics**.....

**8 Environmental performances**.....

**9 List of testing equipment**.....

**10 Safety and EMC**.....

**11 Mechanical drawing** .....

**12 DC cord & plug specs**.....

**13 Name plate**.....

**14 Packaging**.....

## 1 General

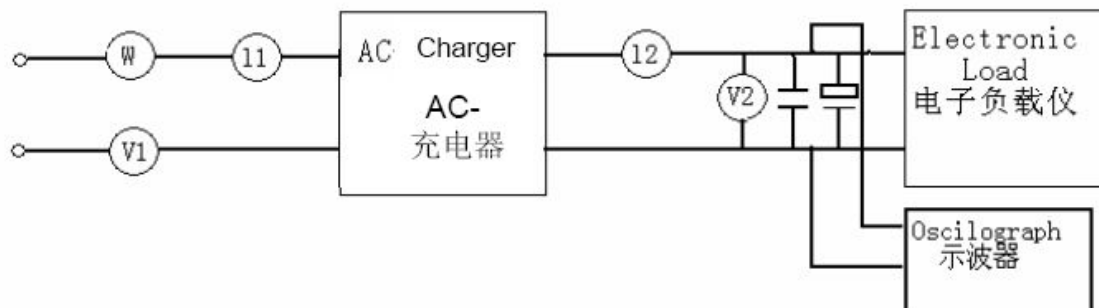
The specification defines an AC-DC switching mode power supply unit with full range AC input and single DC output, compatible with IT&AV devices. The power adapter shall be cooled with natural convection and meets safety requirements, EMC&EMI requirements.

## 2 Quoted criterion

CB/IEC 60065, IEC60950, UL&CUL/UL60950 /60065 CSA C22.2, GB4943/8898, EN60950/60065, J60950/60065, K60950/60065, AS/NZ60950/60065.

## 3 Electrical characteristics

Generally, without special directives, the power adapter will be tested according to the Testing circuit as follows



## 4 Input characteristics

### Rated input voltage

It is from 100V AC to 240V AC input voltage.

### Input voltage range

The adapter operates from 90V AC to 264V AC.

### Efficiency

75% Min at input 100-240V AC /60HZ frequency, output with 5V DC full load.

### Input voltage regulation

The line regulation less than  $\pm 2\%$  at full load and  $\pm 10\%$  input voltage.

The load regulation less than  $\pm 5\%$ .

### Rated frequency

50/60Hz frequency range.

The adapter operates with an input frequency from 47Hz to 63Hz.

### Max input current

0.45A at 100V AC input, 0.25A at 230V AC input.

### Peak inrush current

With cold starting, the inrush current less than 30A at 100-240V AC input.

## 5 Output characteristics

### Rated output voltage and current

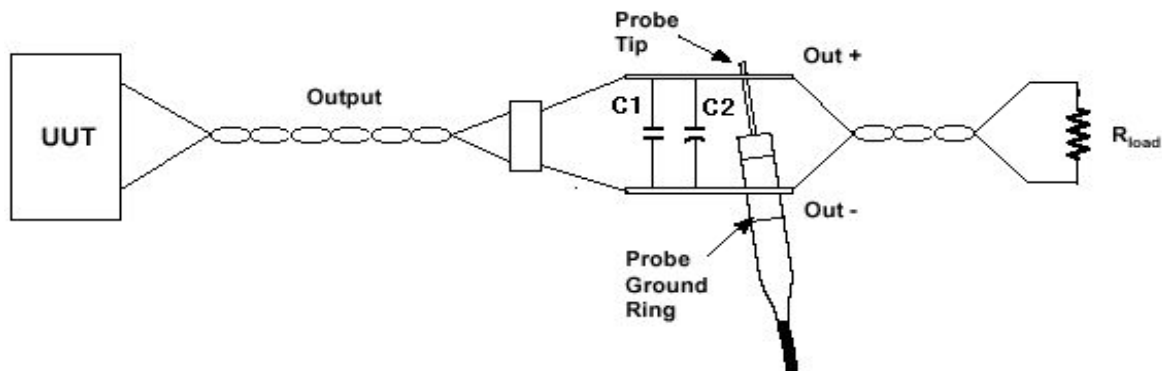
At normal conditions for rated input voltage and frequencies, the rated output voltage and current has slight fluctuation as shows

Output Voltage	Voltage Range		Current Range	
	lower limit	higher limit	min load	full rated load
+ 5V	4.75V	5.25V	0 A	2000mA

### Rated output power

The adapter works constantly for **10W** full load.

Note: the test shall be done under the following conditions: ambient temperature 25° C, relative humidity 35~85%RH, air pressure 86~106kPa.



### Output ripple & noise

The ripple and noise less than 120mVp-p at 100-240V AC input, 50-60Hz frequency, when the adapter is tested at the output terminal with a 47uF EC-capacitor & 0.1uF CC-capacitor, the electromagnetic oscillograph works at 20MHz band-width.

Normal output voltage	Ripple & noise
5V	120mV

**Output over voltage protection**

The adapter will be protected when its output voltage over 5.5V-7.5V.

**Output over current protection**

The adapter will be protected when its output current over 2200mA-3600mA.

**Short circuit protection**

The adapter will be protected when short circuit occurs, without damage, it can start again at normal conditions.

**Power consumption**

The unload consumption less 0.3W at 100-240V AC input.

## 6 Reliability items

**The mean time between failure**

MTBF for the adapter exceeds 50k hours when it works at full rated load but in an ambient temperature 35° C.

**Hi-pot test**

3000V AC, 60s between primary and secondary, leakage current less than 6mA, no Damages in the adapter.

**Insulation test**

500VDC ,60sec between primary and secondary circuit and chassis IR should  $\cong$  100M  $\Omega$  .

**Leakage current**

Less than 0.25mA at input 240V AC/50Hz frequency.

**Ground test**

At 25A current in the AC input terminal, between input ground and output ground, GR less than 0.1  $\Omega$  .

**Temperature rise**

The highest temperature measured on the housing of the adapter does not exceed 70° C when the adapter works at 25° C indoor , the highest temperature rising on the surface does not exceed 45° C When the adapter works at input 100-240V AC and output with 5V DC full load.

**Surge withstanding and EFT**

The adapter can withstand 2kV line transient under common mode and differentiated Mode.

**Transient response**

Less than 10% at output change between 50% and 100% of full load , the slew rate is 0.5A/us, frequency is 100HZ and 100kHz.

**Hold Up Time**

8mS (min) at 100V AC/60HZ, ambient 25°C , output full load.

**Rise Time**

≤20mS at 100V AC/60HZ, ambient 25°C , Output full load, 5%-95% of output voltage.

**Operating direction**

No green LED indicator.

**On-Off life**

The adapter can withstand 5k times on-off repetition of primary power, no failure or Damage at 100-240V AC input.

**Burn-in**

100% aging test at 80-100% full load at 35~40 °C bun-in room, prototype samples aged for 72H, pilot samples aged for 24H, massive units aged for 4H.

**Strain relief test**

The cord and plug can withstand 9kg pulling power for 60S, no breakage or damage On the cord and plug .

**Vibration test**

The test is done referred to IEC publ. 68-2-6 criteria as shows

Testing conditions		Acceptance criteria
Frequency	10-55Hz	No effects on electrical performance, no damage on the adapter
Sweep	2hours, for each axis (X,Y,Z)	
Acceleration	0.6G 1.5 (5-50Hz, peak-peak)	
Displacement	0.35 mm(5-50Hz)	

### **Bending test**

Fix the adapter and its plug, with a load of 200g to the other end, turn around the cable by  $\pm 60^\circ$ , repetitions over 1k times, at a frequency of 20 times per minute, no damages in mechanical and electrical characteristics and defect rate within 10% after The testing.

### **Dropping test**

Drop the adapter at 100cm height to 20mm thick hardwood floor, hit the adapter for 6 times, no mechanical damages or other failures, no electrical defects and other Failures.

### **Appearance inspection**

With visual inspection about the housing, no visual abnormality, no scratches and Other mechanical damages, outer metals have no rust, loosening, shaking, etc.

## **7 Mechanical characteristics**

**Physical size:** (L)76.5\*(W)63\*(H)26.5mm

**Resin Materials:** Flame resistance applies to UL94-V0, PC+ABS black

**Net weight:** 80g+/-5g

**AC Socket:** EU input plug

**DC output plug:** 5.5\*2.1\*12mm



**Output cable:** 1200mm

## **8 Environmental performances**

### **Operating at low temperature**

At  $0 \pm 2^\circ \text{C}$ , with the rated voltage 100-240V AC input to the primary, unload and full load to the secondary, no abnormality in electric and mechanical characteristics after 4H testing.

### **Operating at high temperature**

At  $40 \pm 2^\circ \text{C}$ , with the rated voltage 100-240V AC input to the primary, unload and full load to the secondary, no abnormality in electric and mechanical characteristics after 4H testing.

### **Storage at low temperature**

At  $-20 \pm 2^\circ \text{C}$ , non-operated testing, after 4H recovery, at ambient temperature  $25^\circ \text{C}$ , No abnormality in electric and mechanical Characteristics.

**Storage at high temperature**

At  $70 \pm 2^{\circ}\text{C}$ , non-operated testing, after 4H recovery, at ambient temperature  $25^{\circ}\text{C}$ , No abnormality in electric and mechanical Characteristics.

**Storage at high temperature and high humidity with the adapter operated**

At  $40^{\circ}\text{C}$ , 90~95%RH, operating at 100-240V AC input, unload and full load to the secondary, no abnormality in electric and mechanical characteristics after 4H testing.

**Salty&foggy test for metal parts**

Testing condition, salty water thickness: 5%, equipment temperature:  $35-40^{\circ}\text{C}$ , put the adapter (un-packaged) into the testing cabinet for 24h, after the testing, at  $25^{\circ}\text{C}$ , No rusty and eroded defects on the sockets and plugs.

**9 List of testing equipment**

Items	Equipment	Manufacturer	Model No
1	AC variable-frequency power source	艾诺	AN97001HSS
2	oscilloscope	TEK	TDS1012B
3	Electronic load tester	Chroma	63103
4	multimeter	Fluke	Fluke 187
5	power meter	威博	PF1200
6	Temperature Meter	CENTER	304
7	Electromagnetic interference machine	Italy	PM7000
8	constant temperature and humidity machine	爱斯佩克	EL-04KA
9	vibration measurement instrument	重力	NY2001D
10	data acquisition unit	Agilent	34970A
11	Plug and wire bending machine	奥斯达	CM-817
12	Thruster	ALGOL	20KGF 200N
13	digital caliper	上工	200mm



## 10 Safety and EMC

### Safety

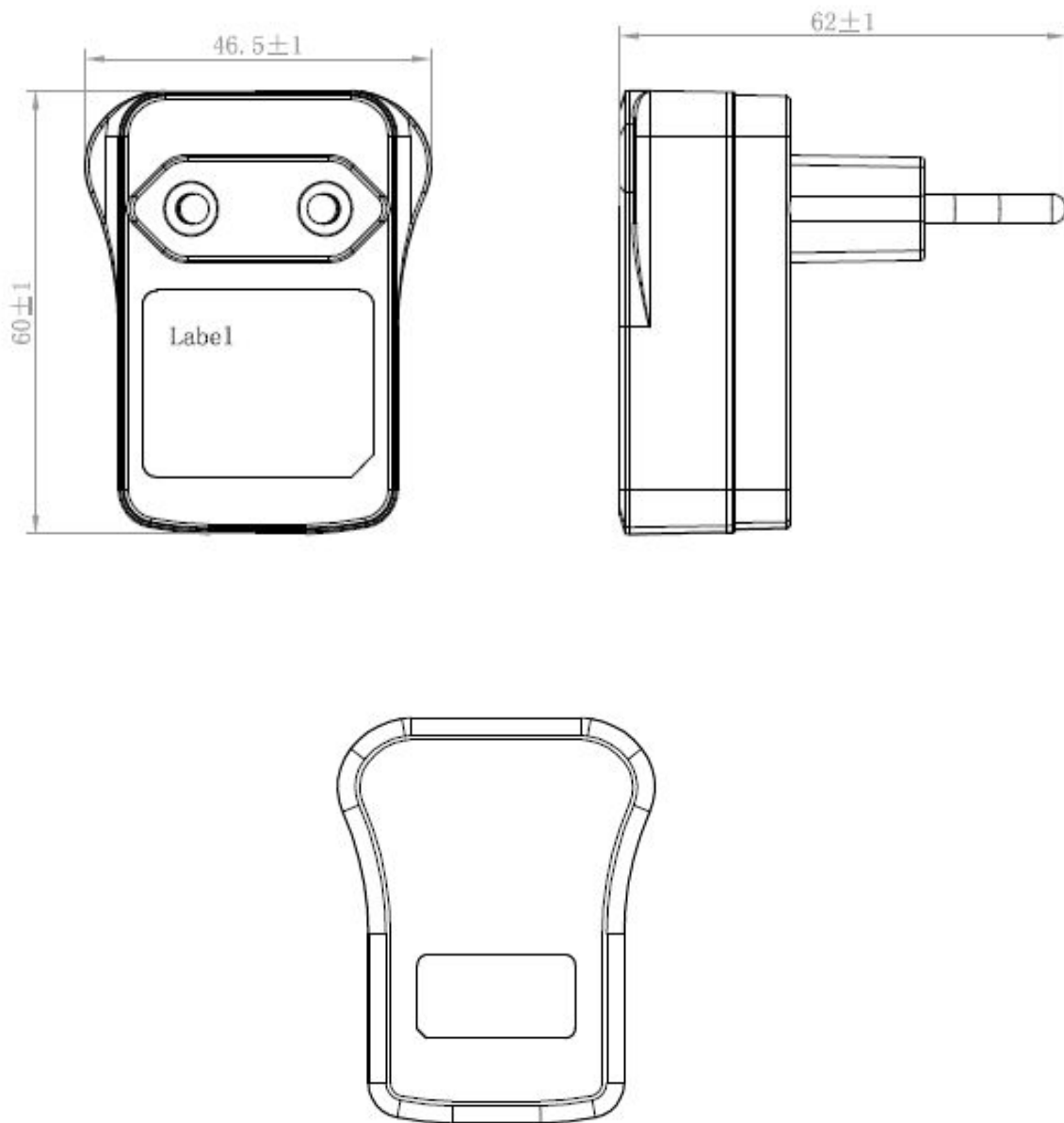
Certificate	Standards	Status
UL	UL60950-1 & UL60065	meet
GS	EN60950 & EN60065	meet
CE	IEC60950 & IEC60065	meet
CB	IEC60950 & IEC60065	meet
CCC	GB4943&GB8898	meet
PSE	J60950/J55022/J60065	meet
Australia	AS/NZS60950/AS/NZS60065/RCM	meet
Korea	K60950-1 &K60065	meet

**EMI:** Meet FCC part 15 Class B/CISPR part 22,Class B/CE/3C

### EMS

Test Item	Test specification	IEC standards
ESD	contact: 4kV/ air: 8kV	IEC61000-4-2
RF	FR: 26mhz-1.0ghz, field strength: 3V/m	IEC61000-4-3
EFT	2kV on AC power line	IEC61000-4-4
SURGE	1kV(l-n) & 2kV(l-pe, n-pe)	IEC61000-4-5
CS	3V/m	IEC61000-4-6
DIPS	0% 250 cycle, 40% 5 cycle, 70% 5 cycle	IEC61000-4-11

## 11 Mechanical drawing

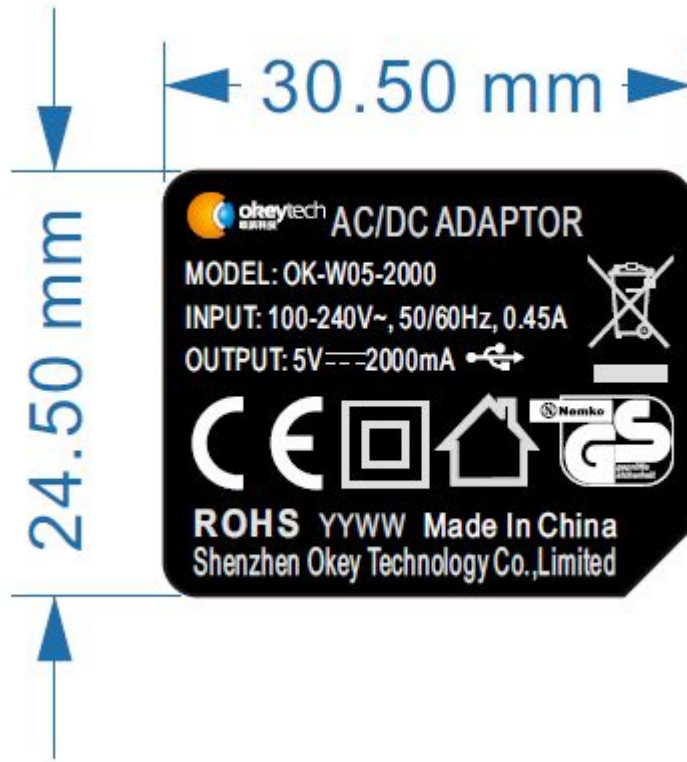


### NOTES:

1. UNIT: mm
2. MATERIAL: PC+ABS
3. COLOR: BLACK
4. TOLERANCE:  $\pm 1.0$ mm

## 12 DC cord & plug specs

### 13 Name plate



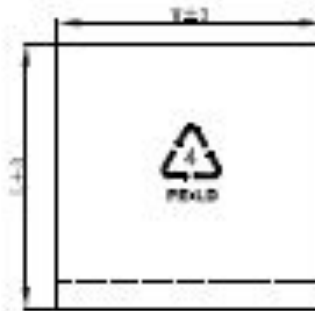
## 14 Packaging

**180 pcs/carton/60pcs/layer**

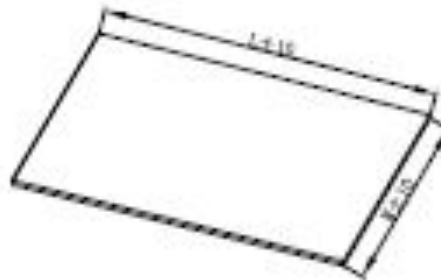
PRODUCT:



↓  
PLASTIC  
BAG:



↓  
PAPERBOARD:



↓  
CARTON:

