



茂硕电源科技股份有限公司

MOSO POWER SUPPLY TECHNOLOGY CO.,LTD

## SPECIFICATION FOR REFERENCE

CUSTOMER : \_\_\_\_\_

CUSTOMER P.N. : \_\_\_\_\_

MODEL NO. : MS-H1670R360-060D0

PRODUCT NO. : \_\_\_\_\_

SAMPLE DATE : 2021-07-17

CUSTOMER AUTHORIZED SIGNATURE		

Please return to us one copy of "SPECIFICATION FOR REFERENCE" with you approved signature.

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## 2. Electrical Specification

### 2-1. General Spec

- SMPS Adaptor(Wall mount)/插墙式适配器       SMPS Adaptor(Desk-top)/桌面型适配器  
 Open Frame/开放式结构       SMPS Unit (metal Case)/带铁壳型  
 Others/其他

此款电源符合 ROHS2.0 2011/65/EU 附录 II (EU)2015/863 要求。

### 2-2. Electrical Requirements

#### 2-2-1. Input Voltage

##### 2-2-1-1. Input Voltages

Normal voltage: 200 to 240VACrms

Voltage range: 176 to 305VACrms

##### 2-2-1-2. Inrush Current(Cold Start)

Criteria: Cold start, at 264Vac, no damage

The rush current of the device conforms to the device specification value I2T meets the bridge stack and fuse specifications.

##### 2-2-1-3. Input Fuse

The input fuse shall not blow up.

##### 2-2-1-4. Input Current

≤1.5A max at 200 to 240Vac input and full load.

##### 2-2-1-5. Frequency

Normal Frequency : 50Hz - 60Hz

Frequency range : 47Hz - 63Hz

##### 2-2-1-6. Efficiency

The average efficiency shall not be less than 88%

- According to ERP VI
- Both 230Vac(50Hz) input voltage condition.
- Average (25%+50%+75%+100%)/4
- The DC power supply shall be operated at 100% of nameplate current output for at least 30 minutes immediately prior to conducting

##### 2-2-1-7. Primary Over Current Protection

An adequate internal fuse on the AC input line shall be provided.

**2-2-1-8. Power Loss (Minimum Load Power Consumption )**

CONDITION		RESULT(SPEC)
INPUT VOLTAGE	200-240VAC	0.21W MAX (INPUT POWER)
OUTPUT VOLTAGE	34.2V - 37.8V	230Vac/50Hz

**2-2-1-9. Input Configuration**

3 Conductors (Live, Neutral) SMPS Unit (metal Case)

**2-2-2. Output Requirements****2-2-2-1. Maximum Output Power:****2-2-2-2. Output Voltage and Current**

OUTPUT VOLTAGE	MINIMUM VOLTAGE	MAXIMUM VOLTAGE	OUTPUT CURRENT	Peak Current	INPUT VOLTAGE
+36V	34.2V	37.8V	1.67 A	/	200Vac-240Vac

table 1

**2-2-2-3. Output Load Regulation**

The output voltage regulation shall meet above table 1, including the effects of line voltage variations, load current, ripple and noise, and the AC component of the load current. The effect of dynamic load changes is not included in this limit.

**2-2-2-4. Ripple and Noise**

A	B
34.2V - 37.8V	1080mVp-p

Column A : Output Voltage.

Column B: Switching Ripple and Noise

Measured methods:

- 1.Performed by 20M Hz bandwidth in oscilloscope.
- 2.Applied 0.1uF high frequency capacitor and 22uF electrolytic capacitor across the end of DC cable.
- 3.Measured at the end of DC cable.
4. tested at 176Vac(60Hz) to 305Vac(50Hz).

**2-2-2-5. Line Regulation**

Line Regulation:  $\pm 2\%$

Line Regulation= $\Delta V/V_{nor} \times 100\%$

$\Delta V: V_{max} - V_{nor}$  or  $V_{min} - V_{nor}$

Note:  $V_{max}$ :The maximum output voltage when the input voltage changes;  $V_{min}$ :The Minimum output voltage when the input voltage changes;  $V_{nor}$ :Rated output voltage.

#### **2-2-2-6. Hold Up Time**

20mS min. @230VAC input and full load

#### **2-2-2-7. Turn On Delay Time**

3S max@ 200Vac to 240Vac input and output & full load

#### **2-2-2-8. Rise Time**

30mS max@ 176Vac to 264Vac input and output Rated Load.

#### **2-2-2-9. Overshoot**

The output overshoot at turn-on shall not exceed +10% (V) of output voltage at no load and full load connected.

#### **2-2-2-10. Dynamic Load Response**

Condition:load step from 20% to 80% to 20%,R/S: 0.10A/uS,

Frequency : 100Hz. Result: $\leq 5\%$  (Dynamic Voltage)

### **2-3. Protection Requirements**

#### **2-3-1. Over Current Protection**

OCP:  $3.34A > I > 1.84A$  @input 200~240Vac 50/60 Hz

The output shall hiccup when the over current applied to the output rail, "and shall be self-recovery when the fault condition is removed."

#### **2-3-2. Short Circuit Protection**

The input power shall decrease when the output rail short, the power supply shall no damage, and shall be self-recovery when the fault condition is removed.

#### **2-3-3. Over Voltage Protection**

OVP:  $\leq 60V$ .

Protected when the output is over voltage, and the power supply shall not be damaged. and shall be self-recovery when the fault condition is removed.

#### **2-3-4. Over temperature protection**

When the power supply is over temperature protected, the power supply will enter the setting working mode, and the output will be automatically restored after the abnormal removal.  $T_c \leq 90^\circ C$ .

## 2-4. Safety and EMC Requirements

### 2-4-1. Earth Leakage Current.

3P Input: 3.5mA Max (264V, 60Hz)

### 2-4-2. Earthing Resistance

Earthing Resistance: <0.1  $\Omega$  at 12VDC/25A/1S.

### 2-4-3. Hi-Pot test

1).Hi-Pot test (Dielectric withstand voltage)-CLASS II

: leakage(cutoff) current 10mA

: Safety Standard Condition:

Primary To Secondary : 3000Vac ,1 minute for type test

: Mass Production Condition:

Primary To Secondary : 3600Vac ,keeping 2 seconds for production

\* Test methods:Input test voltage beginning from zero to 3600Vac in 0.5s.We move plug after discharge display 0V.

\* Test point : Primary Live and Natural Short ↔ Secondary

2).Hi-Pot test (Dielectric withstand voltage)-CLASS I

: leakage(cutoff) current 10mA

: Safety Standard Condition:

Primary To GND : 1500Vac ,1 minute for type test

Primary To Secondary : 3000Vac ,1 minute for type test

: Mass Production Condition:

Primary To GND : 1800Vac ,keeping 2 seconds for production

Primary To Secondary : 3600Vac ,keeping 2 seconds for production

\* Test methods:Input test voltage beginning from zero to 3600Vac in 0.5s.We move plug after discharge display 0V.

\* Test point : Primary Live and Natural Short ↔ Ground

### 2-4-4. Insulation Resistance

Insulation resistance shall be more than 100 M $\Omega$  at 500Vdc between primary live, primary neutral and secondary.

### 2-4-5. RFI/EMI/EMC Standards

The adapter shall comply with a following GB/T9254 GB17625.1 standards when tested in an system configuration.

**2-4-6. EMS Standards****2-4-5-1. EN61000-4-2(IEC61000-4-2:2001 IEC801-2):**

Electrostatic Discharge ESD

Electrostatic Discharge:  $\pm 8\text{KV(Air)}$   $\pm 6\text{KV(Contact)}$ Judgement Level: A B C D**2-4-5-2. EN61000-4-3(IEC61000-4-3:2002 IEC801-3):**

Radiated Immunity RS Radiated Susceptibility: 3V/m, Class A

**2-4-5-3. EN61000-4-4(IEC61000-4-4:1995+A1:2000+ A2:2001 IEC801-4):**EFT/AC Line noise. Transient Test:  $\pm 2\text{KV(EFT)}$   $\pm 2\text{KV(AC Line noise)}$ Judgement Level: A B C D**2-4-5-4. EN61000-4-6(IEC61000-4-6:1996+A1:2000):**

Conducted Radio Frequency

Injected Current Susceptibility: 3Vrms, Class A

**2-4-5-5. EN61000-4-5 Lightning Surge:**

The power supply must satisfy Table's Lightning Surge Spec.

Products	Test Voltage	Test Point & Test Mode	Output Load
Adapter	$\pm 4\text{KV}$	Line to Line : C-Mode	Rated Load
	$\pm 6\text{KV}$	Line to Gnd : CR-Mode	

Measured methods:

a. Environment Requirements: temperature :15~35°C; humidity :10%~75%RH;

b. Surge voltage is applied to the phase: 0° 90° 180° 270°;

c. Surge voltage is applied: for each polarity voltage of each repeated 5 times, a phase done; 10 times, each applied voltage interval of 60 seconds.

Judgement Level: A B C D**2-4-7. Safety Standards**

The adapter shall be certified with the following safety standards:

Type	Country	Certified Status	Standard
CCC	China	APPROVAL	GB4943.1
CE	Europe	Meet	EN62368-1

**2-4-8. EMI**

Design phase:6dB margin(ClassB) Mass production phase:3dB margin(ClassB)  
 The adapter linear load test should comply with standard margin, and better suggest to test with end customer's devices for evaluation. Conducted/Radiated interference: (Power) with Vout grounded or not

**2-5.Reliability Requirement**

**2-5-1. Mean Time Between Failures (MTBF)**

Output Voltage	Min Voltage	Max Voltage	Current	MTBF	Load Condition
+36V	34.2V	37.8V	1.67A	≥200000h	100%

\*Standard: MIL-HDBK-217F;

\*Environment temperature: 25°C

\*Input Voltage: 230Vac

**2-5-2. E-cap Lifetime**

The life estimation of aluminum capacitor must achieve 50,000 hours at Tc=70°C, 80% load Input voltage: 220Vac

Standard: Life Time=Lr \* 2<sup>(To-Tx)/10</sup>

Note: Capacitor Life time ΔTo: Self Heat Coefficient (85°C =10, 105°C = 5)

Lr : Capacitor Life Spec Ia : Measured Ripple Current

To: Capacitor Temp Spec Is : Ripple Current spec

Tx : Capacitor case Temp Ff : Frequency Factor

ΔT : Capacitor Self Heat Tf : Temperature Factor

**2-5-3. Random Vibration Test (non-operating)**

10 to 300Hz sweep at a constant acceleration of 1.0G(Breadth: 3.5mm) for 1Hour for each of the perpendicular axes X, Y, Z.

**2-5-4. waterproof level**

Level: IP65

**2-5-5. Hot Burn-In**

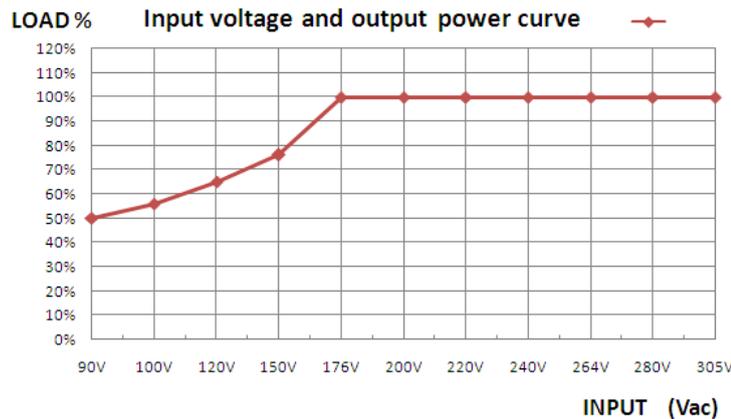
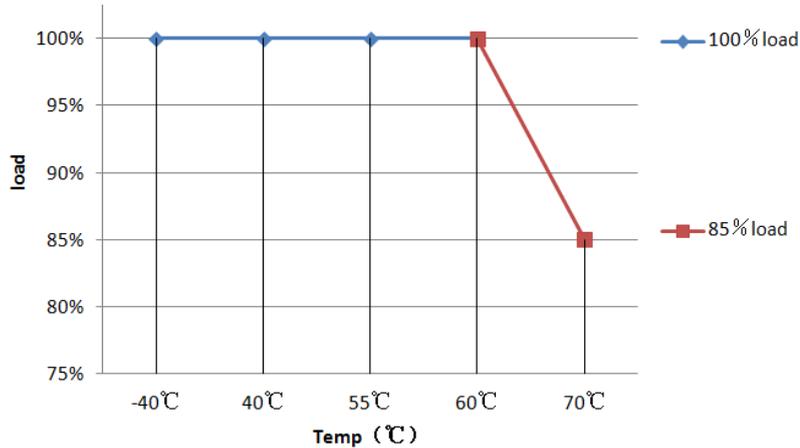
Condition		Result(Spec)
Input Voltage	220Vac	NO Defect, Normal Operating
Output Current	100% load	
Temperature	40°C ± 5°C	
Test Time	2HR	

## 2-6.Environment Requirements

### 2-6-1. Operating Temperature

→ -40°C ~ 60°C @100% load(176Vac,305Vac); 50% load(90Vac);

→ 70°C @ 85% load(176Vac,305Vac);



### 2-6-2. Operating Humidity

→ 10%~90% RH (Condensation : NOT REQUIRED)

### 2-6-3. Storage Temperature

→ -40°C ~90°C

### 2-6-4. Storage Humidity

→ 10%~90% RH (Condensation : NOT REQUIRED)

### 2-6-5. Operation Altitude

→ 0 - 5000m

## 2-7.Mechanical Features

### 2-7-1. Physical Size(Unit:mm):

Length  $130 \pm 2$ mm\* width  $55 \pm 1$ mm \* height  $35.1 \pm 1$ mm

**2-7-2. AC Input Connector:**

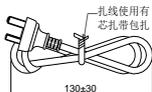
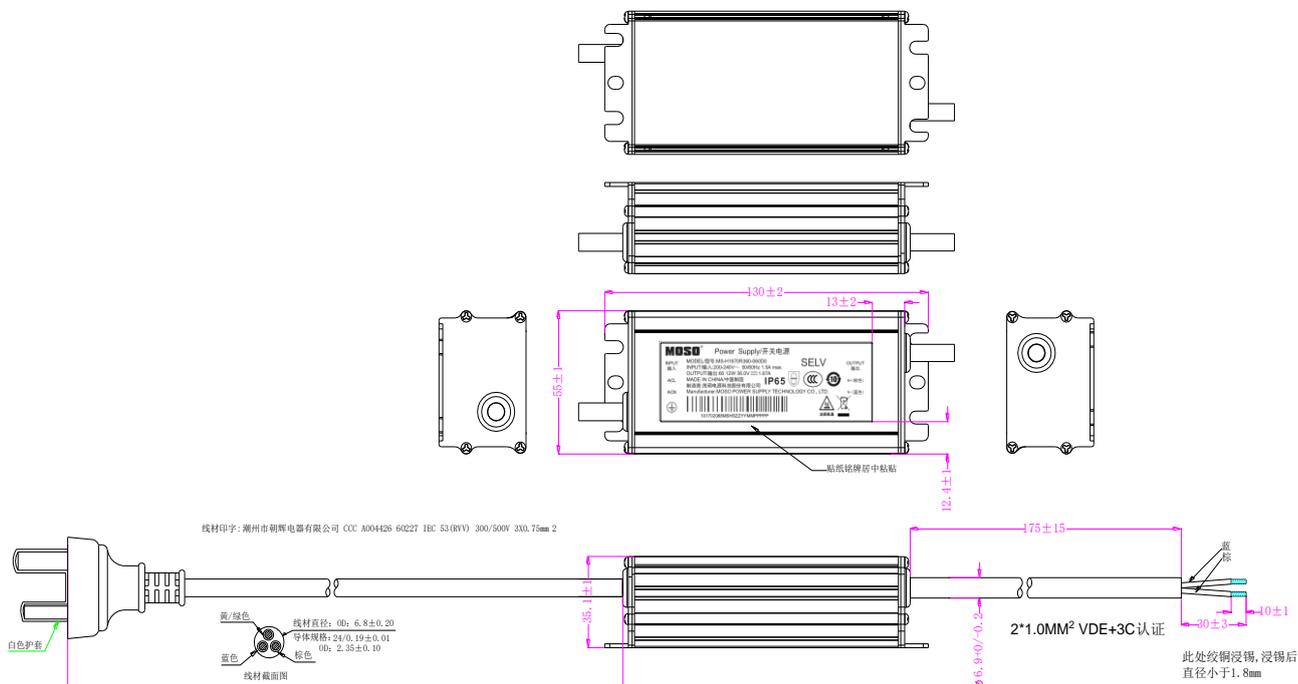
AC Plug 3 PIN (CCC)

**2-7-3. Output Plug :**

DC Plug: /

**2-7-4. LED Light: /****2-7-5. Weight : 445g±10g****2-7-6. Case Color: Silver**

### 5-1. Case Drawing



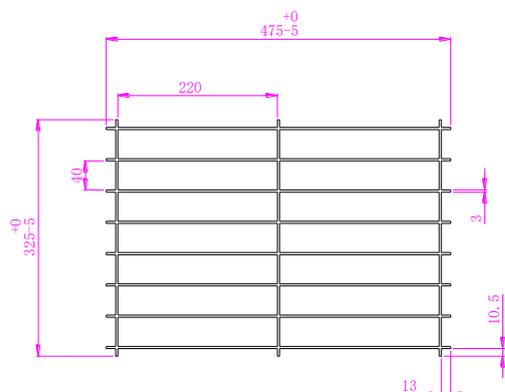
## 5-2. Label Drawing



**备注:**

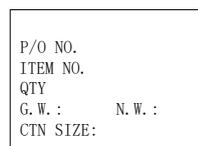
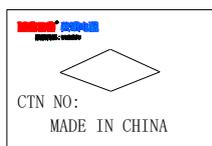
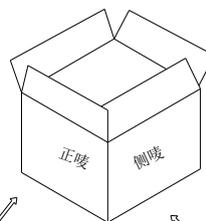
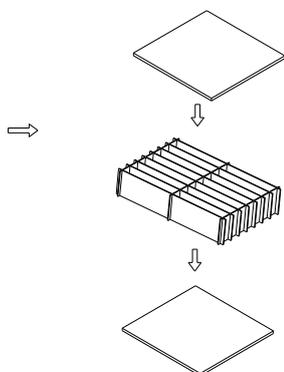
- 1、50# PET+光膜, 白底黑字;
- 2、垃圾桶标识尺寸高度不小于7mm
- 3、符合RoHS, REACH及茂硕环保要求
- 4、背胶耐温90°C, 96h内不翘角, 不脱落, 不起泡.
- 5、酒精擦拭和清水各擦15秒, 用100克的砒码包棉布擦, 字体清晰可见, 无其他不良(如卷边、翘角等)

### 5-3. Packing Drawing

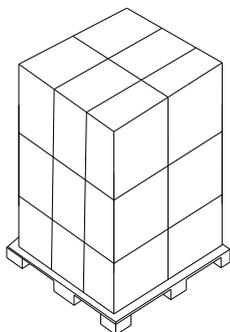


**包装说明:**

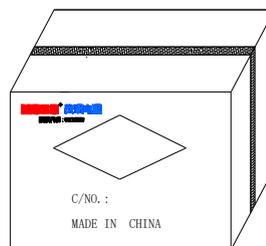
- 一、将产品每PCS装入250\*175 (mm)PE袋中包好, 再将包装的产品放入刀卡槽中, 每层装14PCS, 共装3层, 每箱装42PCS  
即: 14pcs/层\*3层=42PCS/箱
- 二、包装材料使用说明为:
  - 1、组合刀卡435\*375用量: 3PCS
  - 3、PE袋250\*175用量: 120PCS
  - 4、平卡475\*325用量: 4PCS
  - 5、纸箱490\*340\*335: 1PCS
- 三、栈板堆放说明为:
  - 1、栈板尺寸为: L1200\*W1000\*H135mm
  - 2、每层放2行\*3列=6箱
  - 3、竖直堆放3层\*6箱共18箱



纸箱的外尺寸: 490L\*340W\*335H



栈板堆放示意图



产品装入包装箱用胶袋封箱, 位置参考图中所示.

- The requirement of PE bag packing:  PE bag without sealing by adhesive tape.  
 PE bag with sealing by adhesive tape  
 Other requirement

Remark: If the customer has not chose the PE bag packing way, we will use the PE bag without sealing by adhesive tape.