

## SPECIFICATION FOR REFERENCE

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

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

MODEL NO. : \_\_\_\_\_ **MS-Z2000R290-058H0-P** \_\_\_\_\_

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

SAMPLE DATE : \_\_\_\_\_ **2022-06-20** \_\_\_\_\_

CUSTOMER AUTHORIZED SIGNATURE		

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

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## 1. SCOPE

The document detail the electrical, mechanical and environmental specifications of a SMPS, the power supply provide 2A continuous and 5.5A duty cycle mode with 2 mins on/18 mins off. The power supply shall meet the RoHS requirement.

### 1.1. Description

- |  |   |
|--|---|
| <input type="checkbox"/> SMPS Adaptor (Wall mount) | <input checked="" type="checkbox"/> SMPS Adaptor (Desk-top) |
| <input type="checkbox"/> Open Frame                | <input type="checkbox"/> SMPS Unit (With Case)              |
| <input type="checkbox"/> Others                    |   |

## 2. Input Characteristics

### 2.1. Input Voltage & Frequency

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

	Minimum	Nominal	Maximum
Input Voltage	90Vac	100Vac~240Vac	264Vac
Input Frequency	47Hz	60Hz/50Hz	63Hz

### 2.2. Input AC Current

1.6A MAX @90-264Vac input & Full load (Full load means at condition 2A Load)

3.5A MAX @90-264Vac input & MAX load (MAX load means at condition 5.5A Load)

### 2.3. Inrush Current (cold start)

The inrush current of power supply shall be less than the rating of its critical components for all condition o line voltage, Fuse/Bridge Diode  $I^2T[A^2Sec]$  value should be met under 10%of rating at common source AC 230Vac(Wall-out).

### 2.4. Average Efficiency

88% min. @ 120Vac Input & 25%, 50%, 75% and 100% of Full load

88% min. @ 230Vac Input & 25%, 50%, 75% and 100% of Full load

### 2.5. Energy Consumption

No load power <150mW &115Vac/60Hz input

## 3. Output Characteristics

### 3.1. Static Output Characteristics (Ripple & Noise)

Output	Load	Output Range	R&N	Remark
+29.0V	0A ~ 2A	28V ~ 30V	300mVp-p	

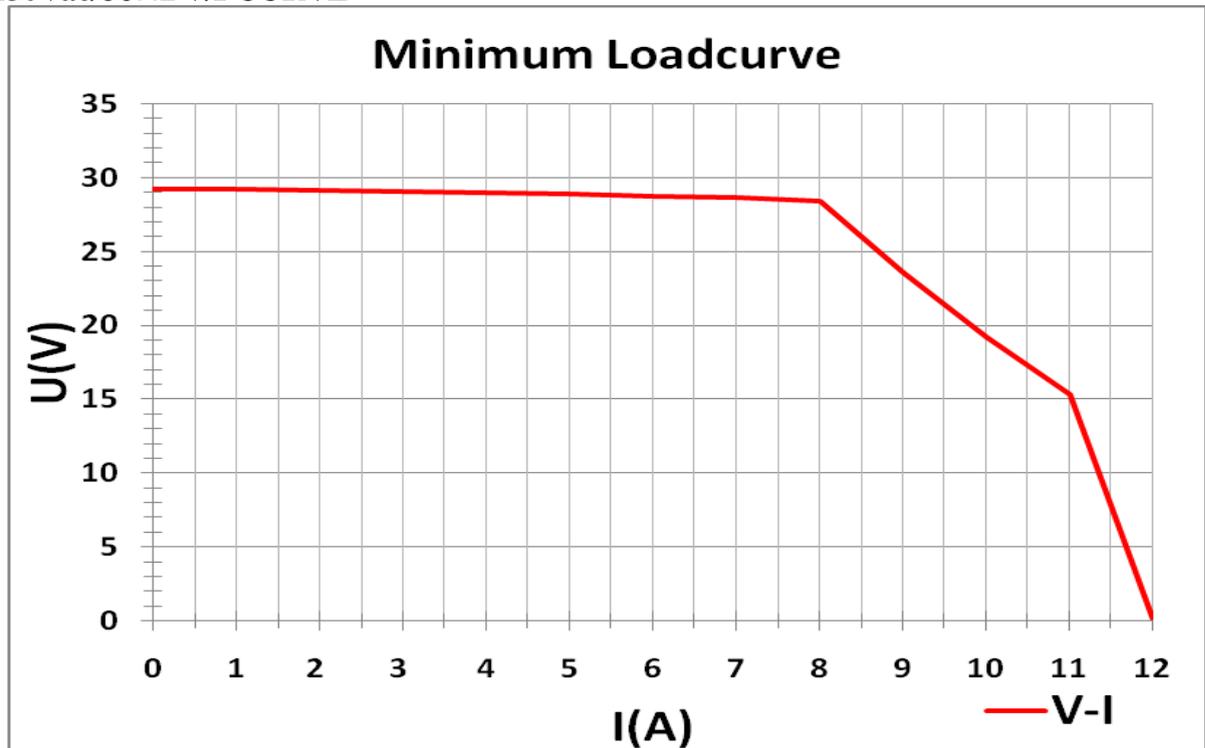
Ripple & Noise: Measurement is done by 20MHz bandwidth oscilloscope and the output paralleled a 0.1uF ceramic capacitor and a 10uF electrolytic capacitor. (Test under the condition of 115Vac/230Vac input and 2A continuous load output)

### 3.2. Line/ Load Regulation

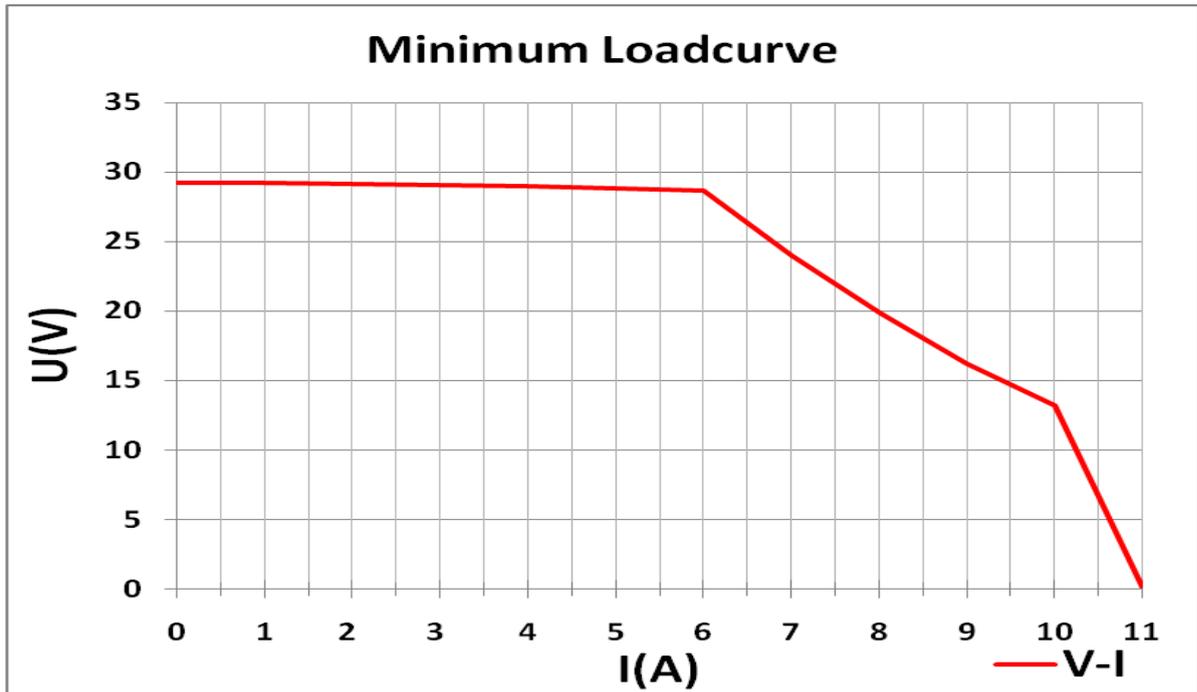
Load regulation @ 29Vdc			
input	output	load condition	$\Delta U_{out}$ in V
115V-230V	29V	0.1A->2A	1.5
115V-230V	29V	2A->0.1A	1.0
115V-230V	28V	0.1A->5.5A	1.8
115V-230V	28V	5.5A->0.1A	1.8

Line Regulation @ 115Vac and 230Vac			
input	output	load condition	$\Delta U_{out}$ in V
115V - 230V	29V	2A	0.29
115V -230V	28V	5.5A	1

#### 230Vac/50Hz V/I CURVE



#### 115Vac/60Hz V/I CURVE



### 3.3. Turn - on Delay Time

3S max. @ 115Vac/230Vac input & Full load.

### 3.4. Hold-up Time

10mS min. @ 115Vac/60Hz input turn off & Full load;

20mS min. @ 230Vac/50Hz input turn off & Full load.

### 3.5. Rise Time

50mS max. @ 115Vac/230Vac input & Full load.

### 3.6. Fall Time

50mS max. @ 115Vac/230Vac input & Full load.

### 3.7. Output Overshoot

10% max. @ 115Vac/230Vac input & Full load.

### 3.8. Dynamic- deviations

a.) Dynamic load cycle from 0A to 5.5A (Loading):

Control response time is  $\leq 25\text{ms}$  @ 115Vac/230Vac input

Voltage decreasing  $\Delta U_{\text{out}} \leq 5\text{V}$  in relation to the static output voltage

b.) Dynamic load cycle from 5.5A to 0A (Load overflow):

Control response time is  $\leq 25\text{ms}$  @ 115Vac/230Vac input

Voltage overflow  $\Delta U_{\text{out}} \leq 1.5\text{V}$  in relation to the static output voltage.

## 4. Protection Requirements

### 4.1. Over Current Protection

Over Current Point Limited: 9A-18.0A @ 120Vac-230Vac

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

#### **4.2. 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.

#### **4.3. Over Voltage Protection**

The charger will auto recovered when open loop faults removed.

#### **4.4. Over Temperature Protection**

A temperature sensor and associated protection circuitry are installed inside the SMPS power to detect the case internal temperature and provide protection against damage to the SMPS power.

### **5. Environment Requirements**

#### **5.1. Operating Temperature and Relative Humidity**

0°C to +40°C

10%RH to 90%RH

#### **5.2. Storage Temperature and Relative Humidity**

-20°C to +80°C

5%RH to 95%RH non-condensing @ Sea level shall be low 10,000 feet.

#### **5.3. Vibration**

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.

#### **5.4. Drop Test**

1000cm height, 20mm thick hardwood, 3 times. The electric performance and safety test after the drop test must be OK.

### **6. Reliability Requirements**

#### **6.1. Burn-in**

The power supply shall be burn-in for 2 Hours under 115Vac/230Vac input and 2.0A continuous load output at 40°C ± 5°C.

#### **6.2. MTBF Qualification**

The MTBF shall be at least 50,000hours at 25°C, 2A continuous load and 115Vac/230Vac input condition.

### **7. EMI/EMS Standards**

#### **7.1. EMI Standards**

EN60601-1-2:2015, IEC60601-1-2:2014 life supporting equipment and system  
(10V/m, 80MHz to 2.5GHz)

EN55011:2009/A1:2010, Group1, Class B

## 8. Safety Standards

### 8.1. Dielectric Strength (Hi-pot)

Primary to Secondary: 4000Vac / 10mA Max / 60second (3 second for production)

If the working voltage(U),Vpeak or VDC is  $212 < U \leq 354$  the AC test voltage in Vrms has to be 4000Vrms(TWO MOPP).

If the working voltage(U),Vpeak or VDC is  $354 < U \leq 848$  the AC test voltage in Vrms has to be  $2x(1.41xU+1500)$ Vrms(TWO MOPP)

### 8.2. Leakage Current

0.1mA max. at 264Vac/50Hz (IEC60601-1)

Test method using leakage current test equipment to collect input and output and set up the input voltage to 264Vac.

### 8.3. Insulation Resistance

50MΩ min. at primary to secondary add 500Vdc test voltage

### 8.4. Regulatory Standards

IEC60601-1:2005/A1:2012 (with TWO MOPP, Touch current : max. 0.1mA)

IEC60601-2:2014 (Class B)

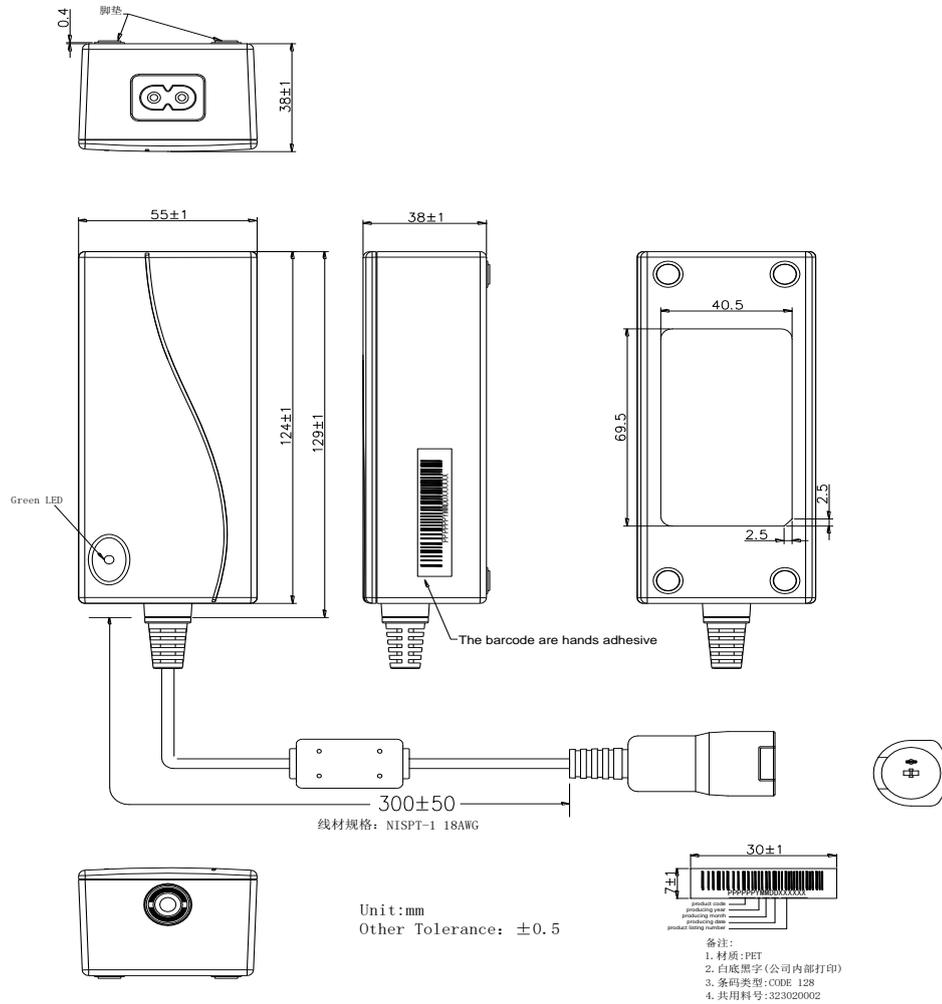
IEC60529:1989/A2:2013 (with IP44)

ANSI/AAMI ES60601-1: A1:2012, C1:2009/(R)2012 and A2:2010/(R)2012, CSA

CAN/CSA-C22.2 NO. 60601-1:14

DOE-Registration (DewertOkin): with level VI (CFR Title 10, Part 430)

## 9. Mechanical Outline Drawing



外壳材质:  PC 耐温: 120°C

PC+ABS 耐温: 95°C

备注: 1)PC 材质符合球压测试要求;

2)外壳与线材为黑色(1101M)。