Specification For Approval

Customer:

Part name: Output 12V/1250mA power adapter—UL

Part number: M120125A001

Approved No.: 2016-06-27 REV:A0

Cust. P/N: ZS 12VDC/1.25A US Medical

QA Dept:	Engineering Dept		
Approved by	**Made by**	**Checked by**	**Approved by**
	Jack		Djroe

Customer Signature **Date:** 2016.06.27

Inspected by	Checked by	Approved by

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1. GENERAL

1.1. Description

This specification defines the performance and characteristics of class 2 adapter, single-phase 15.0 watts. Single output level power supply. This specification also defines worldwide safety requirements and manufactures process test requirements.

Simple design philosophy.

Overload Latch-Off protection during either (a) specified power threshold

Requirements or (b) short circuit condition.

Reliability level of 43000 hours MTBF & 25°C.

DC output voltage must be Safe Extra Low Voltage (SELV) & Limited Power as defined by IEC60601-1 3rd edition. The maximum room ambient temperature, as mentioned in clause 1.4.12 of IEC 60061-1 3rd/IEC61558 edition, for the external power supply is 40°C.

1.2. DC Output Requirements

The power supply shall have one regulated DC outputs of +12.0V. The wall defines the total regulation band for the output, which includes line regulation, load regulation, and effects due to environmental conditions and aging.

Voltage shall be measured at the power supply output connector.

Output	Output Voltage Range		Output Current Range		Ripple/ Noise
Type	Min.	Max.	Min.	Max.	Max.
+12V	+11.4V	+12.6V	0mA	1250mA	100mV

Rated input, output with full load, 20MHz bandwidth. Load end connects with 0.1uF ceramic capacitor and 10uF electric capacitor.

2. INPUT REQUIREMENTS

2.1. Input Conditions

The Supply shall operate over the voltage ranges as follows:

Rated Input Voltage	100-240Vac	
Operating Range	90-264Vac	
Rated Input Frequency	50/60Hz +/- 3Hz	
Maximum input power	18.95W	
Power Consumption (No Loading)	Max 0.3W	

2.2. AC Inrush Current

Peak inrush current shall be limited to 80 A for a cold start. Under both cold & warm start conditions, there shall be no immediate damage or long term impact on the reliability of the Supply. The conformance test for this requirement shall be performed at +12.5% of the rated input voltage. Voltage and current waveforms will be observed on an oscilloscope following closure of the external power switch. Switch closure will be repeated until the waveforms show closure coincident with a voltage peak. The current measured during this occurrence will be defined as the peak inrush current.

2.3. Effiency ' V '

The efficiency of the Supply shall meet the following requirements:

Supply:	Load：	Line：	Efficiency
Universal	Rated Output	100 – 240 Vac	79.15%

3. OUTPUT REQUIREMENTS

3.1. Output Voltage / Current

Output	Voltage	Minimum load	Max load	Peak load
1	+12.0V	0mA	1250mA	/

The unit total output power, under steady state conditions, shall not exceed 18.95W

3.1.1 Load/Line Regulation

The output voltage shall be statically regulated for all combinations of load, line and environment including cross regulation as shown.

Output	Normal Voltage	Min. Voltage	Max. Voltage	Tolerance
	+ 12.0V	+11.4V	+12.6V	+/-5%

3.1.2. Light Load Output Voltage

The output voltage shall be within the specified limits shown when subjected to the following conditions:

Line voltage: 90 Vac – 264 Vac 50 & 60 Hz (Universal)

Load: Io £ 10mA dc

Ambient temperature: 0° C – 40° C

Output voltage: + 12.0Vdc +/-5%

No damage or hazardous condition will occur with the DC output connector disconnected from the load under all input line conditions.

3.2. Short Circuit Protection

The power supply shall have self-limiting protection. The output shall be protected against short circuit conditions.

3.3. Over-voltage protection

The output voltage shall be clamped by internal protection Zener diode.

3.4. Over current protection

The power supply will be protection when output power over 130%—260% of all rated dc output.

3.5. Rise Time

The Supply shall have a start-up rise time of less than 25ms to rise to within regulation limits for all DC outputs.

3.6. Hold Up Time

When power off, DC output + 12.0V must be maintain 5 ms degrees low nominal line input and full rate load.

3.7. Turn On Delay Time

The output shall reach steady state value within 3 sec of turn on.

3.8. Output Ripple

Maximum ripple must be less than 150 mVpp when subjected to the following conditions:

Line voltage: 100Vac-240Vac 50 & 60 Hz (Universal)

Output Load: Full Load

Remarks: Rated input, output with full load, 20MHz bandwidth. Load end connects with 0.1 uF ceramic capacitor and 10uF electric capacitor

3.9. Overshoot

During Turn-On or Turn-Off of the power supply, the output voltage shall not exceed 5%. No voltage of opposite polarity shall be present on the output during turn-on or turn-off.

3.10. Components Thermal Derating

Under nominal output load conditions and any input operating conditions, all components shall not exceed thermal derating. Shall not exceed their designed safety rated temperatures for the insulation.

4. MECHANICAL

4.1. Input connector

AC input connection shall be an UL power connector.

4.2. Output connector

UL authentication: 2464 20# line black, L=1.5 M

Copper head： inner ”+”; outside ”-”; 5.5*2.1*10mm

5. REGULATORY COMPLIANCE

5.1.1. EMC Specifications

The external power supply must meet all specification in this section. It is required that the external power supply work closely with the product in order to get the best EMC solution.

5.1.2. Radiated and Conducted Emission

The power supply shall complied to: FCC part 15 : Class B for radiated and conducted emissions radiated and conducted emission requirements for CISPR 22 Class B.

5.1.3. Immunity

5.1.3.1. Electrostatic Discharge Immunity EN 55024:1998, EN 61000-4-2:

Air Discharge: ±8kV

Contact Discharge: ±2kV

Performance Criteria B

Electrostatic-discharge test by contract or air should be conducted with static-discharge tester, energy storage capacitance of 150pF, and discharge resistance of 330Ω, 8KV air discharge, 2KV contact discharge.

5.1.3.2. Radiated Field Immunity EN 55024:1998, EN 61000-4-3:

Frequency Range: 80-1000MHz

Field Strength: 3 V/m with 80% amplitude modulation of 1kHz

Performance Criteria A

Radio-frequency electromagnetic field susceptibility test, RS 80-1000MHz, 3V/m, 80% AM (1KHz).

5.1.3.3. Fast Transient Immunity EN 55024:1998, EN 61000-4-4:

Power line: 1 kV

Signal line: 0.5 kV

Performance Criteria B

5.1.3.4. Surge Immunity EN 55024:1998, EN 61000-4-5:

1.2/50 usec Open Circuit voltage

8/20 usec Short Circuit current

Power line: 1.0kV

Line to Earth: 2 kV

Lighting Surge Voltage of differential and common modes shall be applies across AC input lines and cross input and frame ground.

5.2. Safety Requirements and Certification

5.2.1. Regulatory Standard

The power supply shall complied the following international regulatory standards:

	Country	Certified Status	Standard
CE	Europe	Meet	Declared& CE Mark
FCC	USA	Meet	FCC part 15
EAC	Russia	Meet	EN61558
TUV	Germany	Meet	TUV/VDE-EN60601-1

5.2.2 Additional Safety Requirements

◎ Dielectric Withstand Voltage, Primary-to-Secondary: 4000Vac RMS input to output for 60 second.

◎ Insulation Resistance, Input to output: 10M OHM at 500 VDC.

◎ The leakage current shall not exceed 10mA at input voltage of 264Vac/50Hz.

6. PRODUCT ENVIRONMENTAL REQUIREMENTS

6.1. Temperature

◎ Operating: 0 oC- +40 oC

◎ Non-Operating: -20 oC- +80 oC

6.2. Humidity

◎ Operating: 5% - 90% (Non Condensing)

6.3. Vibration

Operating: 10-250Hz, 0.25G peak to peak, 3axes, 15min sweep.

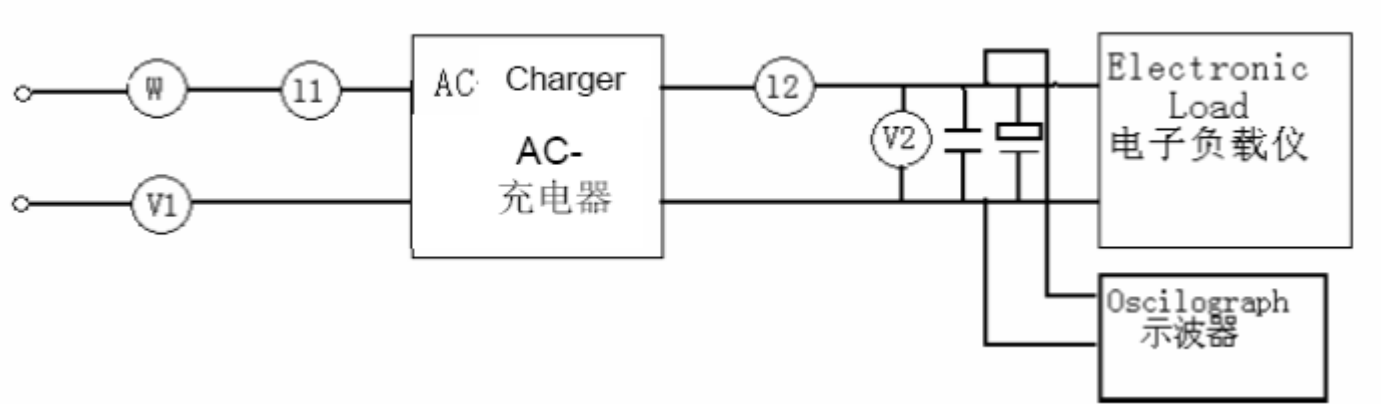
Storage: 10-300Hz, 2.0G peak to peak, 3axes, 15min sweep

6.4. Tensile Strength

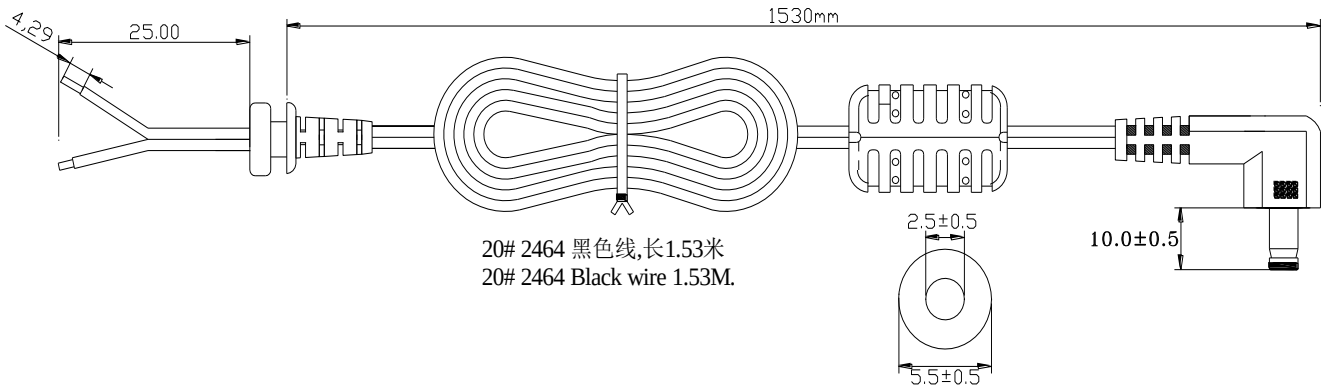
Apply a load of 10N to the adapter side and the connector side for 1 minute. No mechanical damages or other failures no electrical deterioration and other Failures comparing to before test condition.

7. TEST CIRCUIT

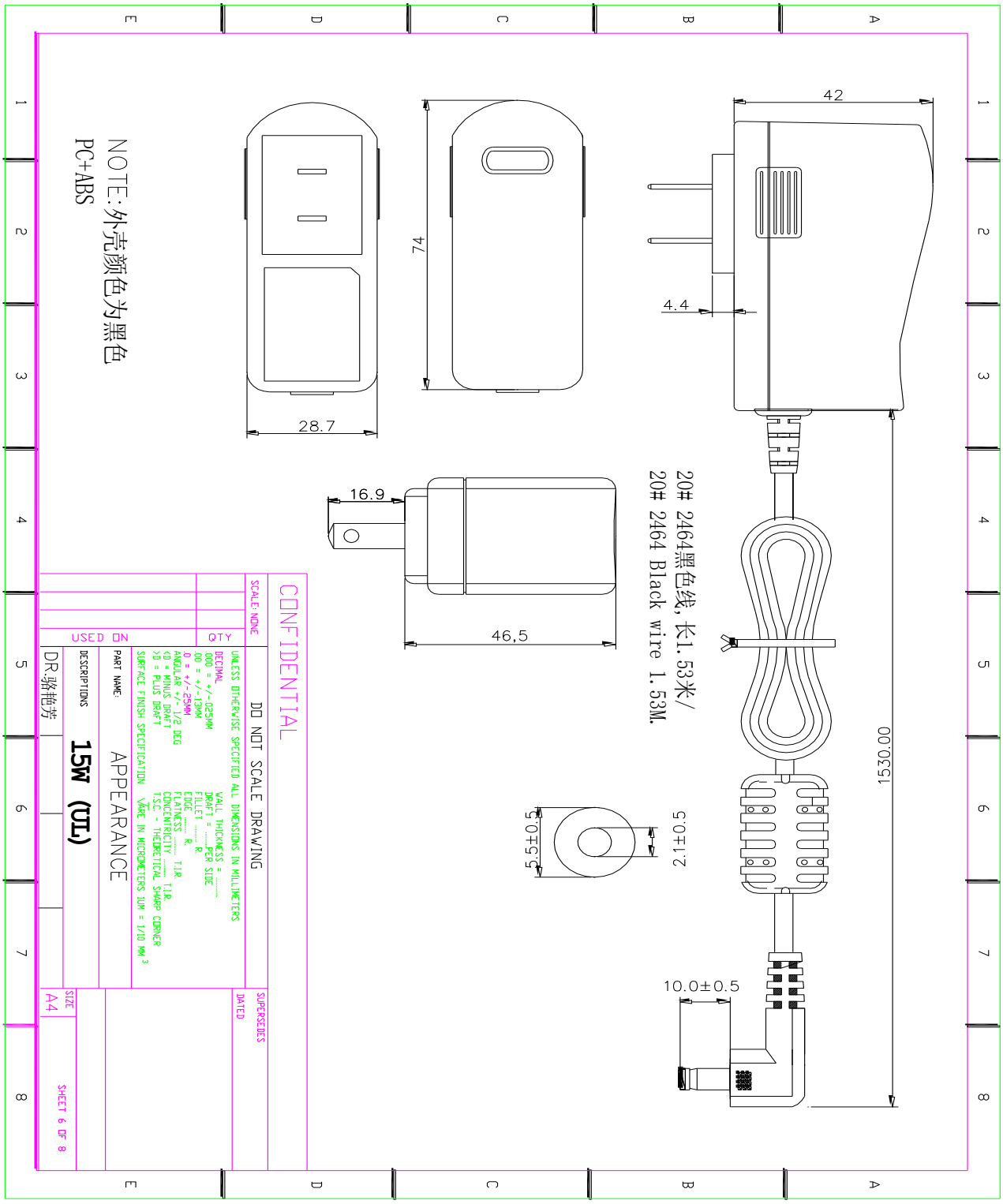
If the test is to be made on a specified circuit, be sure to use the following circuit. Quote Criterion CB/IEC 60601, IEC60601-1



8. DIMENSION OF OUTPUT PLUG & DC CORD (unit: mm)



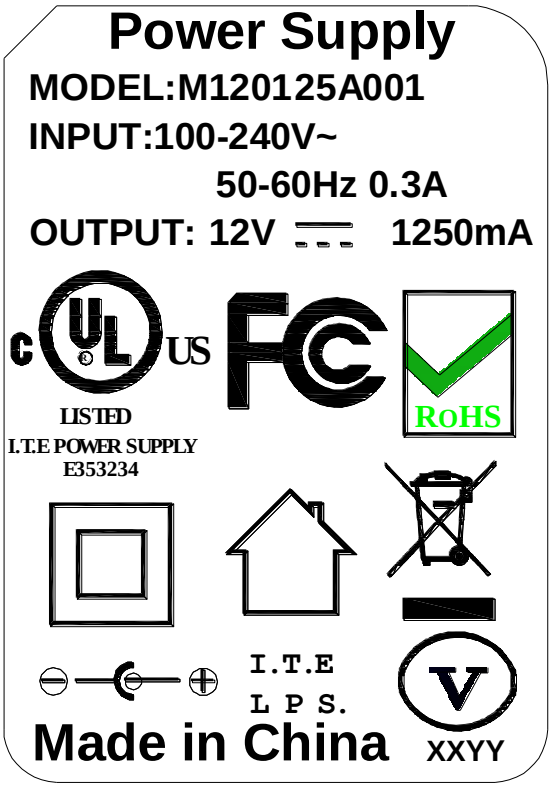
9. APPEARANCE DRAWING (unit: mm)



REMARKS：

1. UL: 2464 20AWG L-1530
2. PLUG: inner ”+”; outside ”-”, 5.5*2.1*10mm
3. Color: black
4. RoHS: yes

10. LABEL DIAGRAM (unit: mm)



Silver background black word

Notes:

1. Thickness: 0.1mm min., inflammation classes 94V-2 or better.

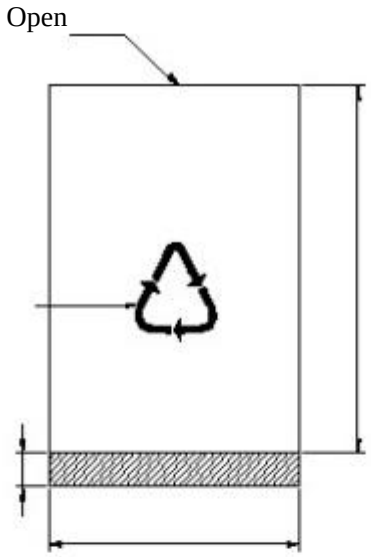
2. Color: Black background with Silver letters.

3. Tolerance: -0.2mm

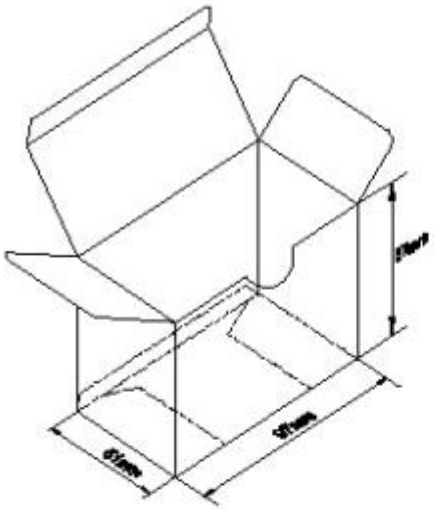
11. PACKING (unit: mm)

1. PE bag

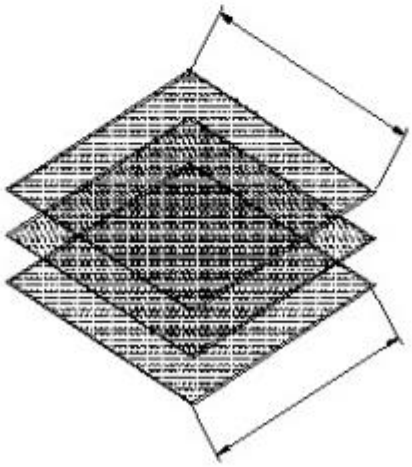
(155*130*0.05)



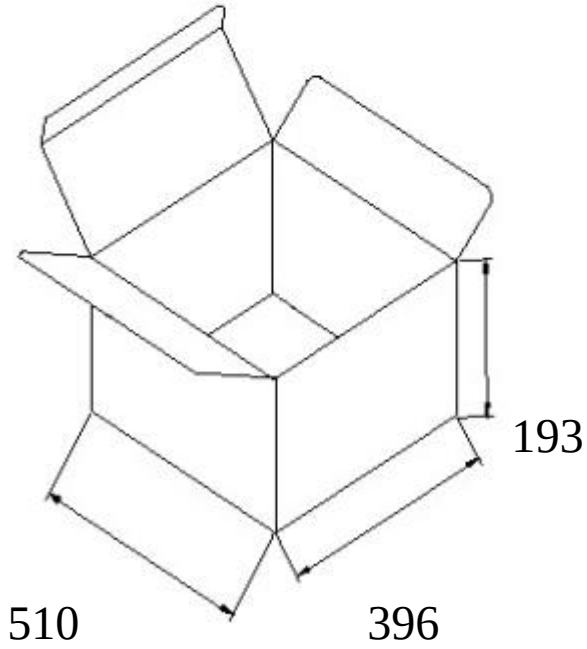
2. White box N.C (100*80*60)



3. Partition 505*390



4. Outside the box 510*396*193



40 PCS/BOX