

Specification for Approval

Customer : **Linkman Co.,Ltd.**

Part Name : **AC ADAPTER**

Description : **12Volts / 2Amps**

Model No. : **STD-12020U (USA / Level V)**

Customer P / N :

Product P / N : **RXTD12020U415211**

Issued Date : **18-Jun.-2010**

Version : **1.1**

Issued Stamp :

Customer's Approval Signature

1. Feature :

- ◆ **Input** : Universal 100 ~ 240 Vac / 47 ~ 63 Hz Input, without any slide switch.
- ◆ **Output** : +12V / 0~2 A
- ◆ **Case Dimension** : 72 (L) * 34 (W) * 69 (H) mm ((±0.5mm))
- ◆ **Efficiency** : Eff (av) ≥ 82.22 % Min.
- ◆ **Safety** : UL / CUL / PSE / BSMI
- ◆ **EMI** : FCC Class B ; Conduction & Radiation Met.
- ◆ **Protection** : OVP (Over Voltage Protection) 、 SCP (Short Circuit Protection) 、 OCP (Over Current Protection)
- ◆ High frequency design , less power consumption.
- ◆ Suitable for usage at Telecommunication, Computer, Industrial Controller, & OA System.
- ◆ Meet Energy Star V / Erp (Stage 2) / MEPS V .

2. Input :

2.1 Voltage	Universal 100~240Vac, single phase
2.2 Frequency	47 ~ 63 Hz
2.3 Current	0.58A Max.
2.4 Inrush Current	30A Max. / 100Vac ; 45A Max. / 230Vac (Cold Start At 25 °C , Full Load)
2.5 Efficiency	Eff (av) ≥ 82.22% Min. (At 115 Vac & 230 Vac)
2.6 Power Consumption	Pi ≤ 0.3 W (At 230Vac & No Load)

$$\text{※Eff (av)} = \frac{E1 + E2 + E3 + E4}{4}$$

E1=efficiency with 25% rated load ; E2= efficiency with 50% rated load
E3=efficiency with 75% rated load ; E4= efficiency with 100% rated load

3. Output :

3.1 DC Output	Voltage	+12V ± 5%
	Current	2.0A Max.
	Regulation	11.4Vmin. ~ 12.0Vtyp. ~ 12.6Vmax.
	Ripple & Noise	100 mV Max.
	Total Power	24W Max.

Remark : For ripple & noise measurement, use a 20MHz bandwidth frequency oscilloscope, and add a 0.1μF multilayer Cap. and a Low ESR Electrolytic Cap. (10 μF) at output connector terminals. (At nominal line voltage, Full Load)

4. Protection :

4.1 Over Voltage Protection (OVP)	15V (Max.)
4.2 Short Circuit Protection (SCP)	Automatic recovery after short-circuit fault being removed
4.3 Over Current Protection(OCP)	4A (MAX)

Remark : When Short Circuit Protection is activated,the power supply will shutdown automatically.

Once the abnormal condition resulting in the failure being removed, the power supply will restart accordingly. When

Over Voltage Protection is activated, the power supply will shutdown.

5. Safety 、EMI and EMC Requirement :

5.1 Safety Requirement

a. Safety : UL / CUL / PSE / BSMI

b. Dielectric Strength : 10mA Max. Cut off current

(1)	Primary to Secondary	3000Vac for 1 Minute
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c. Insulation Resistance :

(1)	Primary to Secondary	10 M Ohm for 500Vdc
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5.2 EMI Requirement : FCC Class B ; Conduction & Radiation Met.

5.3 Leakage Current : Less than 0.25mA

6. Operation and Environment Performance :

6.1 Temperature Range

Operating	+ 0°C ~ + 40°C
Storage	- 20 °C ~ + 80 °C

6.2 Humidity Range(Non-condensing)

Operating	20% ~ 80% RH
Storage	10% ~ 90% RH

6.3 Cooling : By natural air

7. M.T.B.F. : 50,000 Hrs. (At 25°C , By MIL-HDBK-217F)

8.Mechanical :

8.1 Weight : 165 g Typical

8.2 Cable Type : Black UL2468 AWG20
(Wire + Plug)

Plug : $\phi 5.5 \times \phi 2.1 \times 9.5 \text{mm}$ (Tuning Fork & Cannelure)

8.3 Cable Length : 1500mm

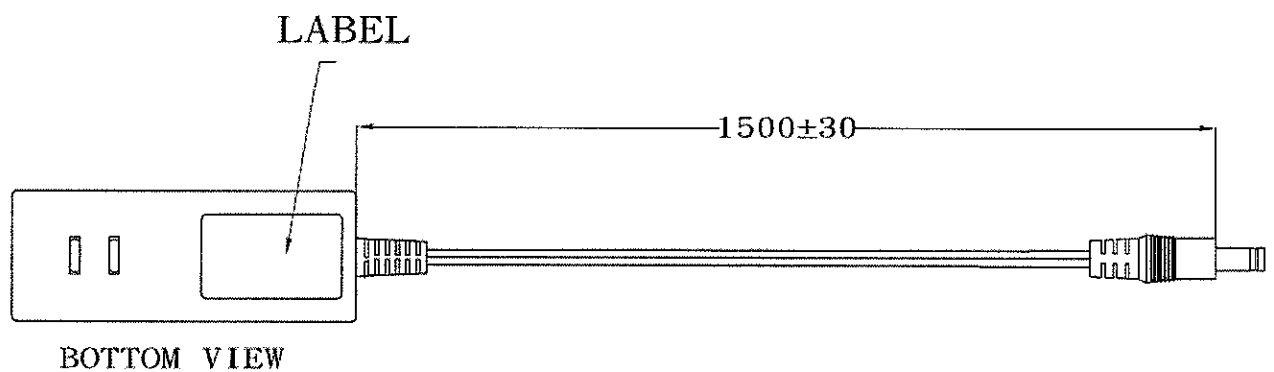
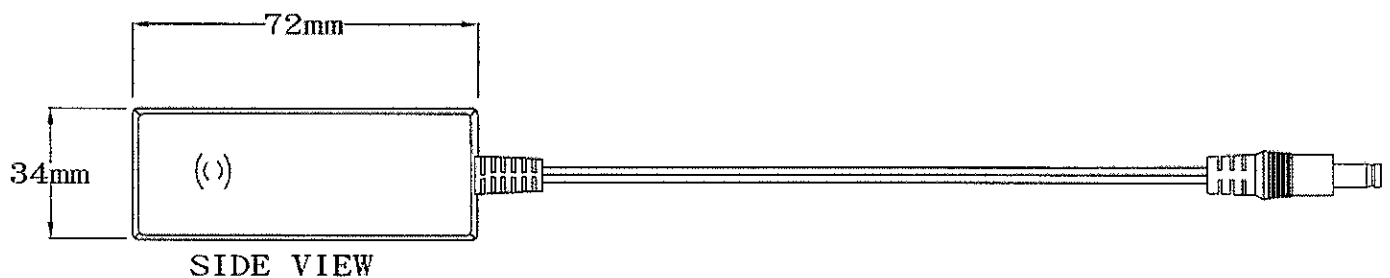
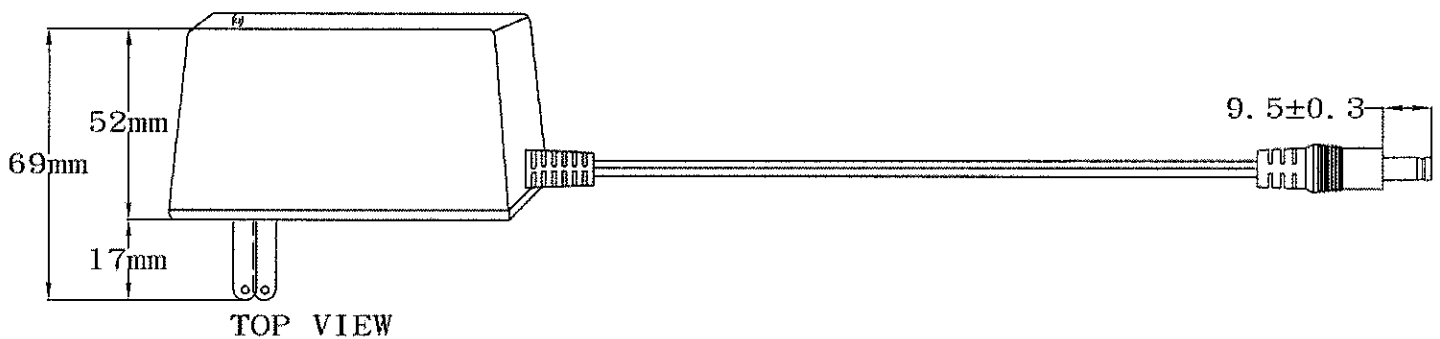
8.4 Case Dimension : 72mm(L)*34mm(W)*69mm(H) ($\pm 0.5 \text{mm}$)

8.5 Material Flammability : UL 94V-0

8.6 External Apperance : As drawing below (Scale - mm)



Output Cable Plug Pin Assignment



A. Line Regulation Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
90Vac / 50 % Load	11.4~12.6 V	11.949 V	11.948 V	11.950 V
115Vac / 50 % Load	11.4~12.6 V	11.950 V	11.949 V	11.951 V
132Vac / 50 % Load	11.4~12.6 V	11.950 V	11.949 V	11.951 V
180Vac / 50 % Load	11.4~12.6 V	11.950 V	11.947 V	11.950 V
230Vac / 50 % Load	11.4~12.6 V	11.950 V	11.949 V	11.949 V
264Vac / 50 % Load	11.4~12.6 V	11.950 V	11.949 V	11.950 V

B. Efficiency Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac	82.22 % Min..	83.25 %	83.11 %	82.98 %
230Vac	82.22 % Min..	82.44 %	82.43 %	82.33 %

$$\text{Eff}_{(av)} = \frac{E_1 + E_2 + E_3 + E_4}{4}$$

E1=efficiency with 25% rated load ; E2= efficiency with 50% rated load
E3=efficiency with 75% rated load ; E4= efficiency with 100% rated load

C. Load Regulation Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 0 % Load	11.4~12.6 V	12.075 V	12.073 V	12.074 V
115Vac / 50 % Load	11.4~12.6 V	11.950 V	11.948 V	11.949 V
115Vac / 100 % Load	11.4~12.6 V	11.824 V	11.825 V	11.822 V
230Vac / 0 % Load	11.4~12.6 V	12.075 V	12.077V	12.073 V
230Vac / 50 % Load	11.4~12.6 V	11.950 V	11.952V	11.948 V
230Vac / 100 % Load	11.4~12.6 V	11.824 V	11.822 V	11.822 V

D. Ripple & Noise Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 100 % Load	100mVpp Max	56.7mVpp	55.4mVpp	55.1mVpp
230Vac / 100 % Load	100mVpp Max	57.5mVpp	58.8mVpp	56.7mVpp

E. Inrush Current

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 100 % Load	30A Max.	27.8 A	27.9A	27.5A
230Vac / 100 % Load	45A Max	42.6 A	43.2A	43.3A

F. Over Current Protection

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 100 % Load	4A Max.	2.688 A	2.658 A	2.701A
230Vac / 100 % Load	4A Max.	3.011 A	2.912 A	3.001A

G. Short Circuit Protection

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 100 % Load	Auto Recovery	OK	OK	OK
230Vac / 100 % Load	Auto Recovery	OK	OK	OK

H. Input Power Consumption(No Load)

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
230Vac / 0 % Load	≤ 0.3 W	0.27W	0.26W	0.27W

Efficiency Test Report

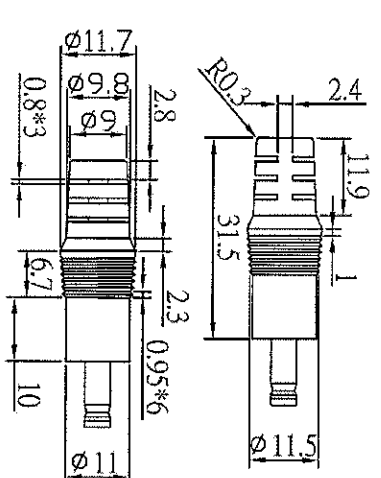
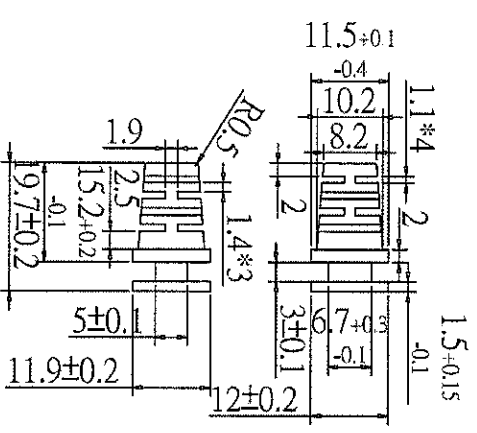
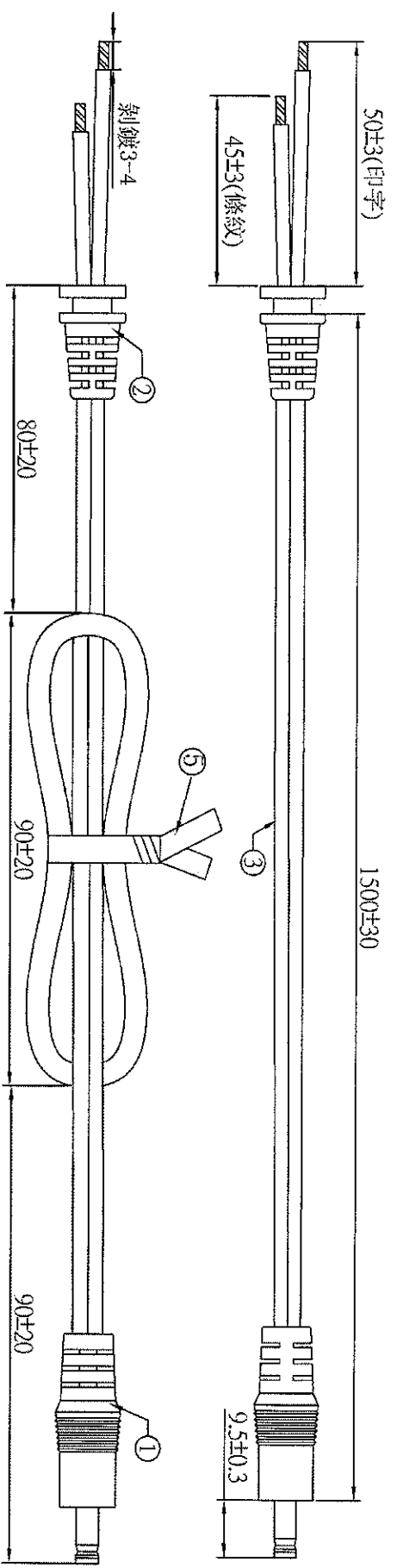
- A. Model Number : STD-12020Z (Z=A,B,C,E,K,T,U,V) (12V / 2A / 24W)
- B. DC Power Cord : UL2468 , 20AWG , 1.8M
- C. Average Efficiency :
 Energy Star V $(0.0626 \cdot \ln(\text{Nameplate Output}) + 0.622) = 82.09 \% \text{ Min.}$
 Erp (Stage 2) $(0.063 \cdot \ln(\text{Nameplate Output}) + 0.622) = 82.22 \% \text{ Min.}$
 MEPS V $(0.0626 \cdot \ln(\text{Nameplate Output}) + 0.622) = 82.09 \% \text{ Min.}$
- D. NO Load Power Consumption :
 Energy Star V 0.3W Max.
 Erp (Stage 2) 0.3W Max.
 MEPS V 0.3W Max.
- E. Testing Equipment :
 a. AC Power Source : " Zentech " 2700M-10
 b. Electronic Load : " PRODIGIT " 3311C
 c. Power Meter : " Zentech " 2100
 d. Digital Meter : " FLUKE " 45
- F. AC Input Voltage : 115Vac/60Hz

Load Conditions Reported Quantity	100%* I ₀	75%* I ₀	50%* I ₀	25%* I ₀	0%* I ₀
Rms Output Current(mA)	2000mA	1500mA	1000mA	500mA	0mA
Rms Output Voltage(V)	11.846V	11.923V	12.001V	12.091V	12.156V
Active Output Power(W)	23.69W	17.88W	12.00W	6.05W	0.00W
Rms Input Voltage(V)	115V	115V	115V	115V	115V
Rms Input Current(A)	0.465A	0.360A	0.259A	0.152A	0.011A
Rms Input Power(W)	29.00W	21.60W	14.30W	7.28W	0.16W
T.H.D. (Voltage)	0.27	0.25	0.21	0.13	0.11
True Power Factor	0.540	0.512	0.468	0.047	0.185
Power Consumed by UUT(W)	5.31W	3.72W	2.30W	1.23W	0.16W
Efficiency	81.70%	82.80%	83.92%	83.04%	*
Average Efficiency	82.87%				*

- G. AC Input Voltage : 230Vac/50Hz

Load Conditions Reported Quantity	100%* I ₀	75%* I ₀	50%* I ₀	25%* I ₀	0%* I ₀
Rms Output Current(mA)	2000mA	1500mA	1000mA	500mA	0mA
Rms Output Voltage(V)	11.845V	11.922V	12.000V	12.078V	12.156V
Active Output Power(W)	23.69W	17.88W	12.00W	6.04W	0.00W
Rms Input Voltage(V)	230V	230V	230V	230V	230V
Rms Input Current(A)	0.313A	0.245A	0.170A	0.097A	0.013A
Rms Input Power(W)	28.70W	21.60W	14.60W	7.41W	0.25W
T.H.D. (Voltage)	0.23	0.18	0.16	0.12	0.11
True Power Factor	0.391	0.378	0.360	0.330	0.078
Power Consumed by UUT(W)	5.01W	3.72W	2.60W	1.37W	0.25W
Efficiency	82.54%	82.79%	82.19%	81.50%	*
Average Efficiency	82.26%				*

Tester : Wei



Fin 6/8



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條紋	印字

注意:此圖面所需材料符合"ROHS"標準

- 5.5*2.1*23 音叉車塘黑色半邊 (YY-PD-00186), 外模 P-184 號模 (二次成型), 用料外 PVC60P 黑色 (YY-PV-00009)
- SR-101 號模, 用料 PVC60P 黑色 (YY-PV-00009), 吊重: 1 米 / 20 磅 / 60 秒
- UL 2468 20AWG (0.16*26) BK OD: 1.9*3.8 (YY-DC-00164) 裁線長度: 1560+10/-0
- PE 有鐵芯 繫帶 10CM 黑色 (YY-ES-00001)
- 絕緣阻抗: 20Ω, 導通阻抗: 1.5Ωmax
- 單位: MM

料號	R44M1915013	
客戶	阿達特	制圖
版次	02	初審
頁數	01	審核
圖號	ADT-0949	日期
02	SR/R	2009/06/04
版次	內容	劉鋒
02	SR/R	