



Specification for Approval

Customer : (PG) Energy Access

Part Name : AC ADAPTER

Description : 24.0Volts / 0.6Amps

Model No. : STD-24006V(RoHS/CEC)

Customer P / N :

Product P / N :

Issued Date : 22-Oct.-2009

Version : 1.0

Issued Stamp :

Customer's Approval Signature

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Approval Documents/Spec. Revised Records

No.	Date (mm/dd/yyyy)	Description (Before / After)	Page(s) Revised	Revised By (Adapter/Customer)	Remark
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14.4W
Switching Power Adapter
SPECIFICATION

Model No. : **STD-24006V(RoHS/CEC)**

Description : **24Volts / 0.6Amps**

Part No. :

Version : **1.0**

Date : **22-Oct.-2009**

Approved	Checked	Prepared



1. Feature :

- ◆ **Input** : Universal 100 ~ 240 Vac / 47 ~ 63 Hz Input, without any slide switch.
- ◆ **Output** : +24 V / 0~0.6A
- ◆ **Case Dimension** : 77.5(L) * 58.1 (W) * 39.2 (H) mm ((±0.5mm))
- ◆ **Efficiency** : Eff (av) ≥ 79 % Min.
- ◆ **Safety** : UL / CUL / PSE / BSMI / RCM / GS
- ◆ **EMI** : FCC / CE 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 CEC Specification .**

2. Input :

2.1 Voltage	Universal 100~240Vac, single phase
2.2 Frequency	47 ~ 63 Hz
2.3 Current	0.48A Max.
2.4 Inrush Current	30A Max. / 100Vac ; 45A Max. / 240Vac (Cold Start At 25 °C , Full Load)
2.5 Efficiency	Eff (av) ≥ 79% Min. (At 115 Vac & 230 Vac)
2.6 Power Consumption	Pi ≤ 0.3 W (At 115 Vac & 230Vac & No Load)

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

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

3. Output :

3.1 DC Output	Voltage	+24V ± 5%
	Current	0.6A Max.
	Regulation	22.8Vmin. ~ 24.0Vtyp. ~ 25.2Vmax.
	Ripple & Noise	100 mV Max.
	Total Power	14.4W 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)	27V (MAX)
4.2 Short Circuit Protection (SCP)	Automatic recovery after short-circuit fault being removed
4.3 Over Current Protection(OCP)	1.5A (MAX)

Remark : When Short Circuit Protection or Over Current 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 / RCM / GS

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

(1)	Primary to Secondary	3000Vac for 1 Minute
c. Insulation Resistance :		
(1)	Primary to Secondary	10 M Ohm for 500Vdc

5.2 EMI Requirement : FCC / CE 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 AWG22
(Wire + Plug)

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

8.3 Cable Length : 2000mm

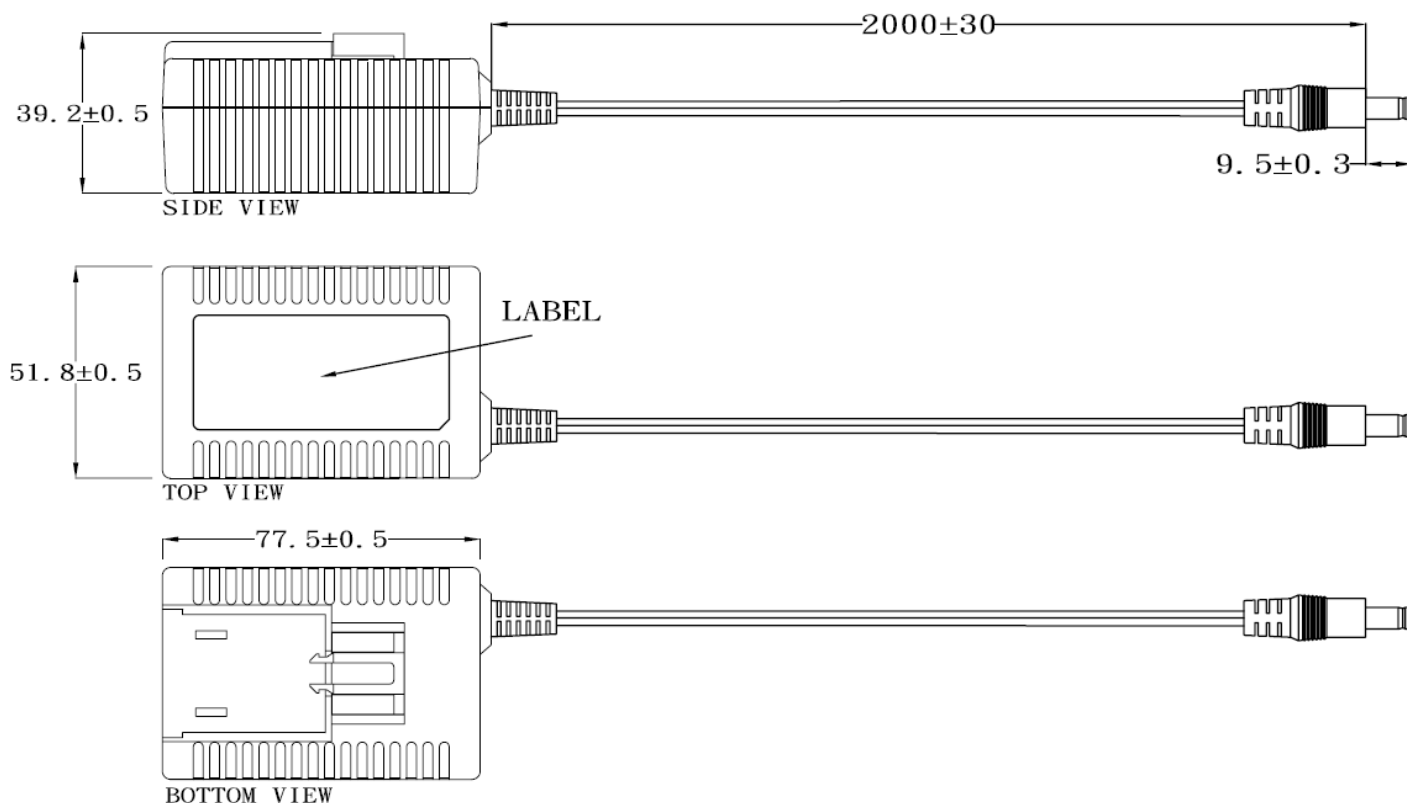
8.4 Case Dimension : 77.5mm(L)*51.8mm(W)*39.2mm(H) ($\pm 0.5 \text{mm}$)

8.5 Material Flammability : UL 94V-0

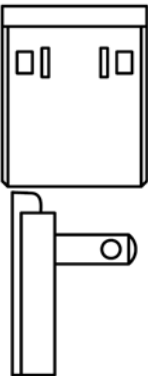
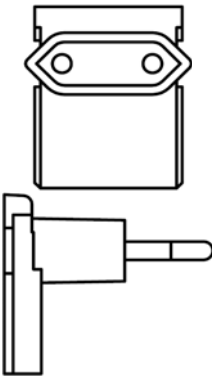
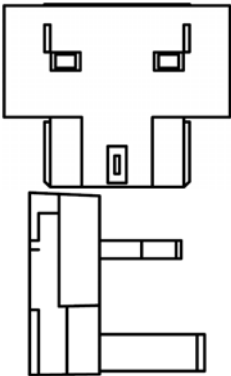
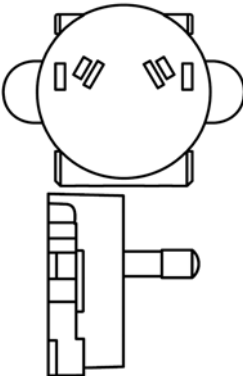
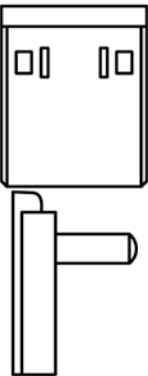
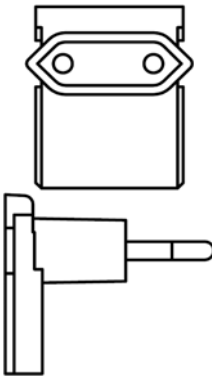
8.6 External Apperance : As drawing below (Scale - mm)



Output Cable Plug Pin Assignment

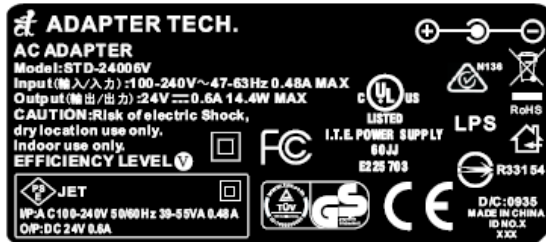


8.7 AC Plug: (L*W*H $\pm 0.5 \text{mm}$)

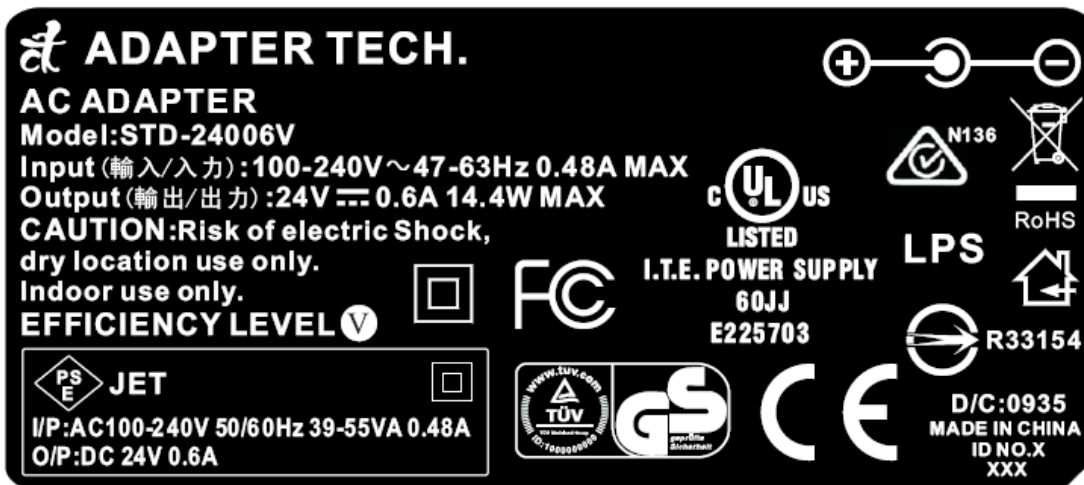
■ USA	■ Europe	■ U.K.	■ Australia	□ China	□ Korea
39.2*31.2* 26	39.2*35*45	39.2*48.6*37.5	41.5*55*34	39.2*31.2* 26	39.2*35*45
					
24P56-0190	24P56-0201	24P56-0210	24P56-0220	24P56-0230	24P56-0241

8.8 Spec. Label Materials : Metalized Polyester Label (Silver Gloss)
 Color : Black Background with Silver Printing
 Label Dimension : 27.5mm(L)*61.8mm(W)+/-0.1mm

100%



200%



"XXX"

Label supplier's code.

It is accurate that the number of words depends on the real finished product.

ID NO. "X"

Manufacturer's code.

It is accurate that the number of words depends on the real finished product.

A. Line Regulation Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
90Vac / 50 % Load	22.8~25.2 V	24.28 V	24.37 V	24.31 V
115Vac / 50 % Load	22.8~25.2 V	24.27 V	24.38 V	24.30 V
132Vac / 50 % Load	22.8~25.2 V	24.27 V	24.37 V	24.30 V
180Vac / 50 % Load	22.8~25.2 V	24.27 V	24.37 V	24.31 V
230Vac / 50 % Load	22.8~25.2 V	24.28 V	24.38 V	24.30 V
264Vac / 50 % Load	22.8~25.2 V	24.28 V	24.38 V	24.30 V

B. Efficiency Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac	79 % Min..	85.3 %	85.11 %	84.98 %
230Vac	79 % Min..	83.8 %	82.43 %	83.33 %

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

E1=efficiency with 25% rated load ; E2= efficiency with 50% rated load

E3=efficiency with 75% rated load ; E4= efficiency with 100% rated load

C. Load Regulation Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 0 % Load	22.8~25.2 V	24.32 V	24.44 V	24.35 V
115Vac / 50 % Load	22.8~25.2 V	24.28 V	24.37 V	24.30 V
115Vac / 100 % Load	22.8~25.2 V	24.24 V	24.30 V	24.26 V
230Vac / 0 % Load	22.8~25.2 V	24.32 V	24.44 V	24.35 V
230Vac / 50 % Load	22.8~25.2 V	24.28 V	24.37 V	24.31 V
230Vac / 100 % Load	22.8~25.2 V	24.24 V	24.30 V	24.26 V

D. Ripple & Noise Test

Test Result :

Test condition	Spec.	Reading 1	Reading 2	Reading 3
115Vac / 100 % Load	100 mV Max.	47.6mV	45.6mV	45.8mV
230Vac / 100 % Load	100 mV Max.	42.4mV	43.3mV	42.8mV

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	1.5A Max.	0.885 A	0.892A	0.877A
230Vac / 100 % Load	1.5A Max.	0.999 A	1.012A	0.984A

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
115Vac / 0 % Load	$\leq 0.3 \text{ W}$	0.29W	0.29W	0.29W
230Vac / 0 % Load	$\leq 0.3 \text{ W}$	0.29W	0.29W	0.29W

CEC TEST REPORT

- A. Model Number : STD-24006Z (Z=A,B,C,E,K,T,U,V) (24V / 0.6A / 14.4W)
- B. DC Power Cord : UL2468 , 22AWG , 1.8M
- C. Average Efficiency :
 Energy Star V $(0.0626 \cdot \ln(\text{Nameplate Output}) + 0.622) = 78.89 \% \text{ Min.}$
 Eup $(0.063 \cdot \ln(\text{Nameplate Output}) + 0.622) = 79 \% \text{ Min.}$
 MEPS $(0.0626 \cdot \ln(\text{Nameplate Output}) + 0.622) = 78.89 \% \text{ Min.}$
- D. NO Load Power Consumption : 0.3W Max.
- E. Testing Dequiment :
 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)	600mA	450mA	300mA	150mA	0mA
Rms Output Voltage(V)	24.260V	24.300V	24.340V	24.380V	24.380V
Active Output Power(W)	14.56W	10.94W	7.30W	3.66W	0.00W
Rms Input Voltage(V)	115V	115V	115V	115V	115V
Rms Input Current(A)	0.295A	0.237A	0.177A	0.101A	0.012A
Rms Input Power(W)	16.84W	12.70W	8.66W	4.54W	0.24W
T.H.D. (Voltage)	0.16	0.15	0.14	0.11	0.09
True Power Factor	0.494	0.464	0.424	0.397	0.171
Power Consumed by UUT(W)	2.28W	1.77W	1.36W	0.88W	0.24W
Efficiency	86.44%	86.10%	84.32%	80.55%	*
Average Efficiency	84.35%				*

- I. 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)	600mA	450mA	300mA	150mA	0mA
Rms Output Voltage(V)	24.250V	24.290V	24.330V	24.370V	24.420V
Active Output Power(W)	14.55W	10.93W	7.30W	3.66W	0.00W
Rms Input Voltage(V)	230V	230V	230V	230V	230V
Rms Input Current(A)	0.203A	0.157A	0.112A	0.065A	0.016A
Rms Input Power(W)	17.11W	12.92W	8.74W	4.67W	0.28W
T.H.D. (Voltage)	0.18	0.15	0.13	0.11	0.1
True Power Factor	0.364	0.356	0.338	0.311	0.073
Power Consumed by UUT(W)	2.56W	1.99W	1.44W	1.01W	0.28W
Efficiency	85.04%	84.60%	83.51%	78.28%	*
Average Efficiency	82.86%				*