



120W
Switching Power Adapter
SPECIFICATION

Model No. : **STD-24050 (LEVEL VI)**

Description : **24Volts / 5Amps**

Part No. : _____

Version : **01**

Date : **19-Jul.-2017**

| Approved | Reviewed | Checked | Prepared | Sales |
|----------|----------|---------|----------|-------|
| | | | | |



1. Feature :

- ◆ **Input** : Universal 100 ~ 240 Vac / 47 ~ 63 Hz Input, without any slide switch.
- ◆ **Output** : +24V / 0 ~ 5A
- ◆ **Case Dimension** : 168.1(L) * 65.9(W) * 39(H) mm ± 1 mm
- ◆ **Efficiency** : Eff (av) ≥ 88%
- ◆ **Safety** : CUL / UL / GS / PSE / BSMI / RCM
- ◆ **EMI** : CE / FCC Class B ; Conduction & Radiation Met.
OVP (Over Voltage Protection), SCP (Short Circuit Protection),
- ◆ **Protection** : OCP (Over Current Protection), OTP (Over Temperature Protection)
- ◆ High frequency design, less power consumption.
- ◆ Suitable for usage at Telecommunication, Computer, Industrial Controller, & OA System.
- ◆ Meet Energy Star VI / Erp (Stage 2) / MEPS V .

2. Input :

| | |
|-----------------------|--|
| 2.1 Voltage | Universal 100 ~ 240Vac, single phase |
| 2.2 Frequency | 47 ~ 63 Hz |
| 2.3 Current | 1.6A Max. |
| 2.4 Inrush Current | 80A Max. / 230Vac (Cold start at 25 °C, full load) |
| 2.5 Efficiency | Eff (av) ≥ 88% (At 115 Vac & 230 Vac) |
| 2.6 Power Consumption | Pi ≤ 0.21W (At 230Vac & No load) |
| 2.7 Power Factor (PF) | Pi ≥ 0.9 (At Full 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 | +24.00V ± 5% |
| | Current | 5A Max. |
| | Regulation | 22.8Vmin. ~ 24.0Vtyp. ~ 25.2Vmax. |
| | Ripple & Noise | 240mV Max. |
| | Total Power | 120W 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) | Vout * 150% Max. |
| 4.2 Short Circuit Protection (SCP) | Automatic recovery after short-circuit fault being removed |
| 4.3 Over Current Protection(OCP) | Iout * 170% 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 latch.

5. Safety, EMI and EMC Requirement :

5.1 Safety Requirement

a. Safety : CUL / UL / GS / PSE / BSMI / RCM

b. Dielectric Strength : Cut off current 10mA

| | | |
|-----|----------------------|----------------------|
| (1) | Primary to Secondary | 3000Vac for 1 Minute |
|-----|----------------------|----------------------|

c. Insulation Resistance :

| | | |
|-----|----------------------|---------------------|
| (1) | Primary to Secondary | 10 M ohm for 500Vdc |
|-----|----------------------|---------------------|

5.2 EMI Requirement : CE / FCC Class B ; Conduction & Radiation Met.

5.3 Leakage Current : Less than 3.5mA

5.4 Grounding Test : Resistance 0.1ohm Max. @ 25A

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. : 300,000Hrs.(Calculated Hours at 25°C , By Telcordia SR-332)

8. Mechanical :

8.1 Weight : 630g Typical

8.2 Cable Type : Black UL1185 16AWG
(Wire + Plug)

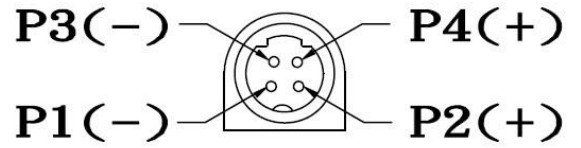
Plug : 4Pin Din

8.3 Cable Length : 1500mm

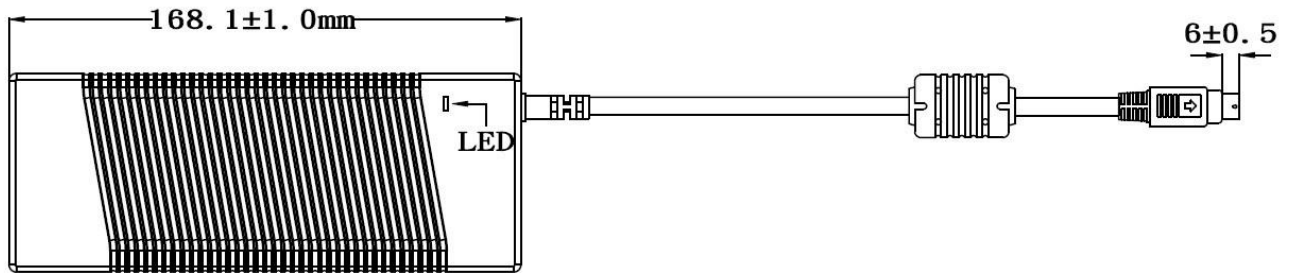
8.4 Case Dimension : 168.1mm(L)*65.9mm(W)*39mm(H) ± 1mm

8.5 Material Flammability : UL 94V-0

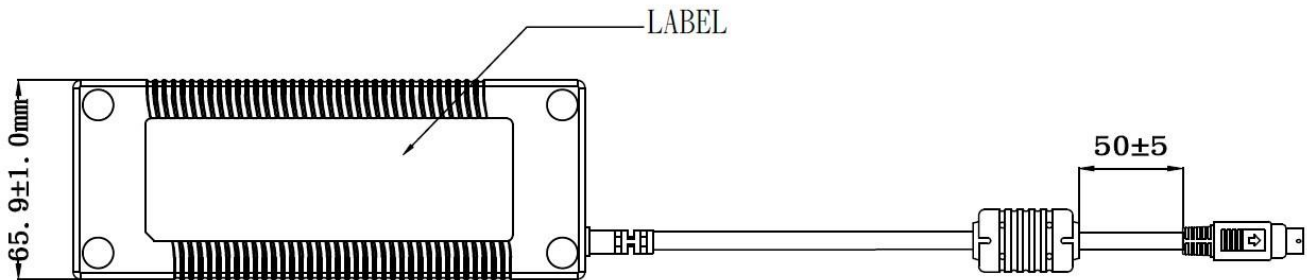
8.6 External Appearance : As drawing below (Scale → mm)



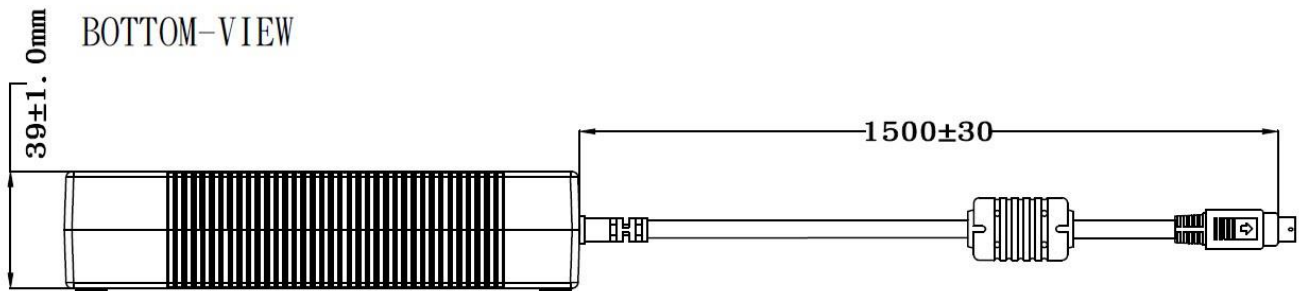
Output Cable Plug Pin Assignment



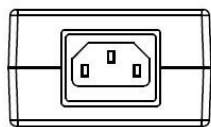
TOP-VIEW



BOTTOM-VIEW



SIDE-VIEW



FRONT-VIEW



A. Line Regulation Test

Test Result :

| Test condition | Spec. | Reading 1 | Reading 2 | Reading 3 |
|--------------------|----------------|-----------|-----------|-----------|
| 90Vac / 50 % Load | 22.8 V ~ 25.2V | 23.934V | 24.185V | |
| 115Vac / 50 % Load | 22.8 V ~ 25.2V | 23.934V | 24.186V | |
| 132Vac / 50 % Load | 22.8 V ~ 25.2V | 23.934V | 24.186V | |
| 180Vac / 50 % Load | 22.8 V ~ 25.2V | 23.764V | 24.151V | |
| 230Vac / 50 % Load | 22.8 V ~ 25.2V | 23.764V | 24.152V | |
| 264Vac / 50 % Load | 22.8 V ~ 25.2V | 23.764V | 24.152V | |

B. Efficiency Test

Test Result :

| Test condition | Spec. | Reading 1 | Reading 2 | Reading 3 |
|----------------|-----------|-----------|-----------|-----------|
| 115Vac | 88 % Min. | 90.20% | 90.47 % | |
| 230Vac | 88 % Min. | 90.60% | 91.07 % | |

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

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 V ~ 25.2V | 24.438V | 24.507V | |
| 115Vac / 50 % Load | 22.8 V ~ 25.2V | 24.101V | 24.186V | |
| 115Vac / 100 % Load | 22.8 V ~ 25.2V | 23.878V | 24.969V | |
| 230Vac / 0 % Load | 22.8 V ~ 25.2V | 24.300V | 24.501V | |
| 230Vac / 50 % Load | 22.8 V ~ 25.2V | 24.070V | 24.151V | |
| 230Vac / 100 % Load | 22.8 V ~ 25.2V | 23.866V | 23.942V | |

D. Ripple & Noise Test

Test Result :

| Test condition | Spec. | Reading 1 | Reading 2 | Reading 3 |
|---------------------|------------|-----------|-----------|-----------|
| 115Vac / 100 % Load | 240mV Max. | 76.8mV | 69.4mV | |
| 230Vac / 100 % Load | 240mV Max. | 77.4mV | 62.1mV | |



E. Inrush Current

Test Result :

| Test condition | Spec. | Reading 1 | Reading 2 | Reading 3 |
|---------------------|----------|-----------|-----------|-----------|
| 230Vac / 100 % Load | 80A Max. | 70.5A | 67.2A | |

F. Over Voltage Protection

Test Result :

| Test condition | Spec. | Reading 1 | Reading 2 | Reading 3 |
|---------------------|----------------|-----------|-----------|-----------|
| 115Vac / 100 % Load | Vout*150% Max. | 115% | 114% | |
| 230Vac / 100 % Load | Vout*150% Max. | 115% | 115% | |

G. Over Current Protection

Test Result :

| Test condition | Spec. | Reading 1 | Reading 2 | Reading 3 |
|---------------------|----------------|-----------|-----------|-----------|
| 115Vac / 100 % Load | Iout*170% Max. | 138% | 138% | |
| 230Vac / 100 % Load | Iout*170% Max. | 133% | 131% | |

H. Short Circuit Protection

Test Result :

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

I. Input Power Consumption(No Load)

Test Result :

| Test condition | Spec. | Reading 1 | Reading 2 | Reading 3 |
|-------------------|---------------|-----------|-----------|-----------|
| 230Vac / 0 % Load | ≤ 0.21 W | 0.193W | 0.187W | |

J. Power Factor

Test Result :

| Test condition | Spec. | Reading 1 | Reading 2 | Reading 3 |
|---------------------|------------|-----------|-----------|-----------|
| 115Vac / 100 % Load | ≥ 0.9 | 0.995 | 0.994 | |
| 230Vac / 100 % Load | ≥ 0.9 | 0.956 | 0.955 | |



Efficiency Test Report

- A. Model Number : STD-24050 (24V / 5A)
- B. DC Power Cord : UL1185 , 16AWG , 1.5M
- C. Average Efficiency :
- Energy Star VI 88% min.
- Erp (Stage 2) 87% min.
- MEPS V 87% min.
- D. NO Load Power Consumption :
- Energy Star VI 0.21W max.
- Erp (Stage 2) 0.5W max.
- MEPS V 0.5W max.
- E. Testing Dequpiment :
1. AC Power Source : "APE" APW-110N
2. Electronic Load : " PRODIGIT " 3356
3. Power Meter : "YOKOGAWA" WT210
4. Digital Meter : " FLUKE " 45
- F. AC Input Voltage : 115Vac/60Hz

| Reported Quantity | Load Conditions | | | | |
|--------------------------|-----------------------|----------------------|----------------------|----------------------|---------------------|
| | 100% * I ₀ | 75% * I ₀ | 50% * I ₀ | 25% * I ₀ | 0% * I ₀ |
| Rms Output Current(mA) | 5000mA | 3750mA | 2500mA | 1250mA | 0mA |
| Rms Output Voltage(V) | 23.878V | 23.990V | 24.101V | 24.219V | 24.438V |
| Active Output Power(W) | 119.39W | 89.96W | 60.25W | 30.27W | 0.00W |
| Rms Input Voltage(V) | 115V | 115V | 115V | 115V | 115V |
| Rms Input Current(A) | 1.173A | 0.876A | 0.591A | 0.557A | 0.015A |
| Rms Input Power(W) | 133.92W | 99.70W | 66.53W | 33.32W | 0.12W |
| Voltage T.H.D.(%) | 0.11 | 0.10 | 0.10 | 0.10 | 0.08 |
| True Power Factor | 0.995 | 0.991 | 0.979 | 0.520 | 0.068 |
| Power Consumed by UUT(W) | 14.53W | 9.74W | 6.28W | 3.05W | 0.12W |
| Efficiency | 89.15% | 90.23% | 90.56% | 90.86% | * |
| Average Efficiency | 90.20% | | | | |

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

| Reported Quantity | Load Conditions | | | | |
|--------------------------|-----------------------|----------------------|----------------------|----------------------|---------------------|
| | 100% * I ₀ | 75% * I ₀ | 50% * I ₀ | 25% * I ₀ | 0% * I ₀ |
| Rms Output Current(mA) | 5000mA | 3750mA | 2500mA | 1250mA | 0mA |
| Rms Output Voltage(V) | 23.866V | 23.964V | 24.070V | 24.200V | 24.300V |
| Active Output Power(W) | 119.33W | 89.87W | 60.18W | 30.25W | 0.00W |
| Rms Input Voltage(V) | 230V | 230V | 230V | 230V | 230V |
| Rms Input Current(A) | 0.600A | 0.461A | 0.322A | 0.306A | 0.024A |
| Rms Input Power(W) | 131.64W | 99.09W | 67.00W | 33.15W | 0.19W |
| Voltage T.H.D.(%) | 0.11 | 0.11 | 0.10 | 0.11 | 0.09 |
| True Power Factor | 0.956 | 0.937 | 0.907 | 0.472 | 0.035 |
| Power Consumed by UUT(W) | 12.31W | 9.23W | 6.83W | 0.48W | 0.19W |
| Efficiency | 90.65% | 90.69% | 89.81% | 91.25% | * |
| Average Efficiency | 90.60% | | | | |

Tester : Ray