

1. SCOPE

This document details the electrical, mechanical and environmental specifications of a switching power supply.

1.1 Description

Wall Mount

Desk-Top

Open Frame

Others

2. INPUT REQUIREMENTS

2.1 Input Voltage & Frequency

The range of input voltage is from 90Vac to 264Vac

	Min.	Normal	Max.
Input Voltage	90Vac	100-240Vac	264Vac
Input Frequency	47Hz	50/60Hz	63Hz

2.2 Input Current

The maximum input current is 500mA max. at 100-240Vac.

2.3 Inrush Current

The inrush current will not exceed 70A at 100-240Vac input and Max load for a cold start at 25°C.

2.4 Stand-By Power

The input power should be less than with No-Load.

3. OUTPUT FEATURES

3.1 Output Parameters

	Output Data	Spec. Limit			Test Condition
		Min. Value	Typical	Max. Value	
3.1.1	12.0Vdc				
3.1.2	Output Voltage	11.4Vdc	12.0Vdc	12.6Vdc	0 A Loading
3.1.3	Output Voltage	11.4Vdc	12.0Vdc	12.6Vdc	1.0A Loading
3.1.4	Output Load	0.0A	—	1.0A	
3.1.5	Ripple and Noise	—	—	300mVp-p	20MHz Bandwidth 10uF Ele. Cap.0.1uF Cer. Cap.

TEN PAO P/N	REV.	DATE	SHEET
R026940V-V	0	Aug. 23,2016	Page 4 of 17

3.2 Turn On Delay

During turn on and turn off, no output voltage shall exceed its nominal voltage by more than **10%** and no output shall change its polarity with respect to its return line. All outputs shall reach their steady state values within **3** seconds of turn on.

3.3 Hold Up Time

10 ms minimum at **115Vac/60Hz** input at maximum load, and **20** ms minimum at **230Vac/50Hz** input at maximum load.

3.4 Typical Efficiency

The efficiency (watts out / watts in) shall be higher than typical while measuring at nominal line and maximum load condition, test in 1 minute after power on.

3.5 Output Transient Response

The power supply shall maintain output transient response time within with a loading current change from 20% to 80% of maximum current and 0.5A/μs rise up /drow down test at end of output terminal.

4. PROTECTION REQUIREMENT

4.1 Over-Voltage Protection

Over-voltage protection shall be included in the adaptor circuit. A single component failure must not cause an over voltage.

4.2 Over-Current Protection

The adaptor must have a current limiting function on the output voltage. in overload mode, the output must drop to a low voltage.

4.3 Short-Circuit Protection

The adaptor must withstand a continuous short circuit on the output without damage.

5. ENVIRONMENTAL CONDITIONS

5.1 Operating

The power supply shall be capable of operating normally in any mode without malfunction happens in the following environmental conditions.

5.1.1 Operating Temperature: 0°C ~40°C (Can operate normally)

Relative Humidity: 10% ~ 90%

Altitude: Sea level to 2,000 m.

5.1.2 Vibration: 1.0mm, 10 –55Hz, 15 minutes per cycle for each axis (X, Y, Z).

5.1.3 Cooling: Natural convection cooling

5.2 Non - Operating

The power supply shall be capable of withstanding the following environmental conditions extended periods of time, without sustaining electrical or mechanical damage and subsequent operational deficiencies.

TEN PAO P/N	REV.	DATE	SHEET
R026940V-V	0	Aug. 23,2016	Page 5 of 17

5.2.1 Storage Temperature: -30°C ~ 70°C

5.2.2 Relative Humidity: 10% ~ 90%

5.2.3 Altitude: Sea level to 2,000 m.

5.2.4 Vibration and Shock:

The power supply shall be designed to withstand normal transportation vibration per MIL-STD-810D, method 514 and procedures X, as it is mounted in the chassis assembly and packed for shipping.

6. RELIABILITY AND QUALITY CONTROL

6.1 MTBF

When the power supply is operating within the limits of this specification the MTBF shall be at least 50,000 hours at 25°C (MIL-HDBK-217F).

6.2 Burn-In

The power supply shall withstand a Burn-In test under full load at 35°C ~40°C room temperatures, after test, product shall operate normally.

6.3 Component Derating

Semiconductor junction temperatures shall not exceed the manufacturer's maximum thermal rating.

7. MECHANICAL CHARACTERISTICS

7.1 Physical Dimensions

The detail dimension of the power supply is drawn on APPENDIX A.

7.2 Nameplate

The label of the power supply, please see APPENDIX C.

7.3 Drop test

Dropped freely from 1 m (for wall mount product) height onto the surface is consisted of hardwood 13 mm thick, mounted on two layers of plywood each 19-20 mm thick, all supported on concrete floor 1 time from 3 different surface, after test, it's no safety damage for product.

8. SAFETY

8.1 Safety Standard

The power supply shall be certified under the following international regulatory standards

TEN PAO P/N	REV.	DATE	SHEET
R026940V-V	0	Aug. 23,2016	Page 6 of 17

Item	Country	Certified	Standard
CE	Europe	Approved	EN60950-1

8.2 Insulation Resistance

Input to output: **10 MΩ** min. at **500 VDC**.

8.3 Dielectric Strength (Hi-Pot)

Primary to Secondary **AC3750V,5mA** 1 minute for type test,
AC3750V,5mA 2 seconds for product.

8.4 Leakage Current

The leakage current shall be less than **0.25mA** for **Class II** when the power supply is operated maximum input voltage and maximum frequency.

9. EMC STANDARDS

9.1 EMI Standards

The power supply shall meet the radiated and conducted emission requirements for **EN55022**.

9.2 EMS Standards(**EN55024**)

The power supply shall meet the following EMS standards

9.2.1 IEC61000-4-2 Electrostatic Discharge (ESD)

Static – discharge test by contact or air should be conducted with Static – discharge tester, energy storage capacitance of 150pF, and discharge resistance of 330Ω.
8KV air discharge, **4KV** contact discharge, Performance Criterion B.

9.2.2 IEC61000-4-3 Radiated Electromagnetic Fields(RS)

Radio- frequency Electromagnetic Field Susceptibility Test, RS, 80-1000MHz,3V/m, 80%AM(1KHz), Performance Criterion A.

9.2.3 IEC61000-4-4 Electrical Fast Transient / Burst (EFT)

Power Line to Line: **1KV**
Performance Criterion B.

TEN PAO P/N	REV.	DATE	SHEET
R026940V-V	0	Aug. 23,2016	Page 7 of 17

- 9.2.4 EN61000-4-5 Lightning Surge Attachment
Lightning Surge voltage of differential and common modes shall be applied across AC input lines and across input and frame ground.
Power Line to Line: **1KV**
Performance Criterion B.
- 9.2.5 IEC61000-4-6 Conducted Radio Frequency Disturbances (CS)
Conducted Radio Frequency Disturbances Test, CS, 0.15-80 MHz, 3V/m, 80%AM, 1KHz, Performance Criterion A.
- 9.2.6 IEC61000-4-11 Voltage Dips/Short Interruption/Variations
Voltage Dips, 30% reduction- 10ms, Performance Criterion B, 60% Reduction – 100ms, Performance Criterion C, Voltage Interruptions>95% Reduction- 5000ms, Performance Criterion C.

10. OTHER REQUIREMENTS

10.1 Hazardous Substances

The components and used materials shall be in compliance with

- EU Directive 2011/65/EU "RoHS"
 EU Directive 2012/19/EU "WEEE"
 Halogen Free
 REACH

10.2 Energy Efficiency

10.2.1 The No-Load power consumption shall be less than **0.3W** at input **115/230Vac 60/50Hz.**

10.2.2 The average active mode efficiency shall be higher than **77.85%** at input **115/230Vac 60/50Hz.**

10.2.3 International Efficiency Level V .

Korea Energy Efficiency Label

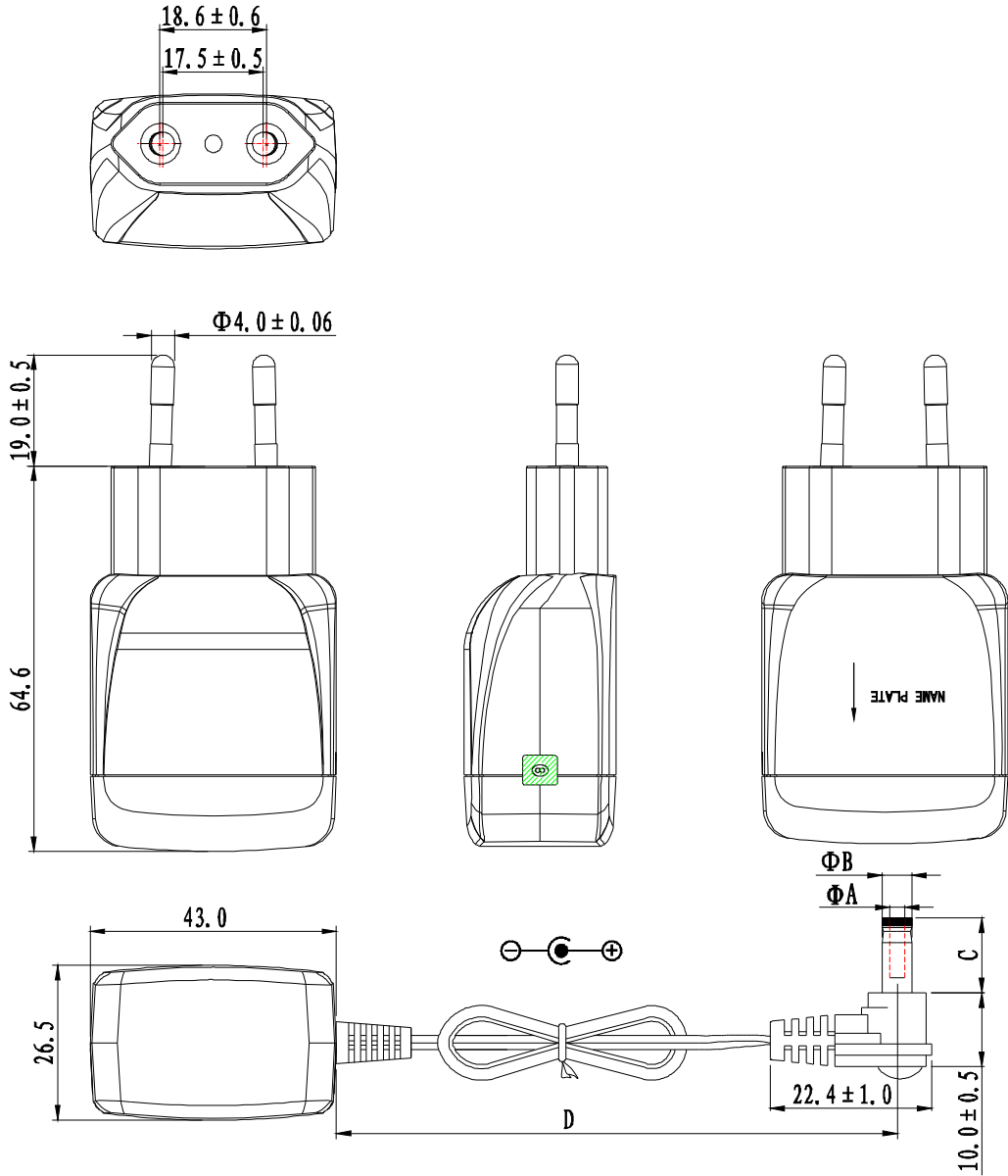
10.2.4 This power supply is therefore in compliance with the requirements of

- California Energy Commission Energy Efficiency requirements for external power supplies (CEC)
 The Power Supply are in accordance with U.S. Department of Energy(DOE) 10 CFR Part 430 .
 Canada's Energy Efficiency Regulations for External Power Supplies
 Australian and New Zealand Energy Performance Requirements for external power supplies (MEPS,AS/NZS 4665.1,AS/NZS 4665.2)
 China Energy Efficiency requirements for external power supplies (GB20943)
 Korea regulation on Energy Efficiency Labeling and Standards for external power supplies (MKE's Notification 2008-99)
 Implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for no-load condition electric power consumption and average active efficiency of external power supplies (**No 278/2009 ,Stage 2**)

TEN PAO P/N	REV.	DATE	SHEET
R026940V-V	0	Aug. 23,2016	Page 8 of 17

APPENDIX A

Mechanical Dimensions(Unit: mm) Tolerance Of unspecified Parts:±1.5mm



	ΦA	ΦB	C	D
DIMENSION	2.1	5.5	12.0	1830
TOLERANCE	+0.1/0	±0.1	±0.5	min.
REMARK	AWG20# UL2468 WHITE			

TEN PAO P/N	REV.	DATE	SHEET
R026940V-V	0	Aug. 23,2016	Page 9 of 17