1. ELECTRICAL

1.1 Input Characteristics:

1.1.1 Nominal Voltage

It is normal for **100 ~ 240Vac** input AC voltage.

1.1.2 Input Voltage Range

The Adapter shall operate from **90 ~ 264Vac**.

1.1.3 Rated Frequency

It is normal for **50Hz** or **60Hz** and single phase.

1.1.4 Frequency Range

The Adapter shall operate with an input frequency from **47 Hz** to **63 Hz**.

1.1.5 Input Current

1.5A Max at **100Vac** input voltage.

1.1.6 Inrush Current Limit (cold start)

No damage; meet fuse and bridge diode I^2t de-rating specified

1.1.7 Efficiency (Warm Up)

1.1.7.1 **84 %** min. at nominal input voltage, maximum load and measured at the end of DC cable.

1.1.7.2 Active mode efficiency:

More than **88**% of average efficiency of **25%,50%,75%** and **100%** load tested at **115Vac** and **230**Vac. (Warm up after 30 minutes)

More than **87**% of average efficiency of **25%,50%,75%** and **100%** load tested at **100Vac** . (Warm up after 30 minutes)

1.1.8 No Load Power Consumption

Maximum non-load power consumption is less than **0.21W** at**100Vac/50Hz and 115Vac/60Hz and 230Vac/50HZ**

1.1.9 Small Load Power Consumption

Vin=100Vac/50Hz and115Vac/60Hz and 230Vac/50Hz

Output load(W)	Input power (max)
0.2W	0.5W

1.2 Output Characteristics:

1.2.1 Rated Voltage

The rated output voltage is specified at **19V**.

1.2.2 Voltage Range

The output voltage will be performed **18.5V~ 20V** when the load is **0A ~ 3.42A** steadily.

1.2.3 Current

This Adapter can work from **0A** to **3.42A** and output voltage is in section 1.2.2 specified range.

1.2.4 Output Ripple and Noise

Output ripple voltage is **300 mV** peak to peak or less.

Measured methods:

T1. Performed by **20M** Hz bandwidth in oscilloscope.

T2. Applied **0.1uF** high frequency capacitor and **10uF** electrolytic capacitor across output connector terminals.

T3. Full load and measured at the end of DC cable.

1.2.5 Turn On delay time

The Adapter shall switch on in less than **3 seconds** at full load at input voltage is 115Vac and 230Vac .

1.2.6 Hold –up time

The output voltage shall be sustained **5mS** within regulation requirement after loss 115Vac and 230Vac at maximum load.

1.2.7 Rise time

DC output rise time from 10% to 90% of output voltage shall be greater than 15ms and less than 50ms at 115Vac and Full load

1.2.8 Surge load:

1.2.8.1 The adapter shall support 3.9A for at 5 sec at 90 ~ 264Vac and less than 1% duty,

Vo>17V

1.2.8.2 Duration 5ms, 50%duty cycle:

a. 0A~4.4A,(max step load<=1.95A), Vo must be less than 20V and more than 18V.

b. 0A~4.4A(max step load=4.4A),Vo must be more than 17.8V.

1.2.9 Load transient response

The adapter must within regulation when applied a step load from 0.1Ato 3.42A load at **0.1A/us** slew rate and frequency is DC to 10K Hz

The output voltage will be performed **18.5V~ 20V.**

1.2.10 Over-shoot

The output overshoot shall be less than +/-10% Output

1.2.11 Protection

1.2.11.1 Over Voltage Protection

The output shall be protected to latch off at over-voltage condition, maximum value can't be over **25V .** That might be return to normal state by AC reset . .

(peak over 25V could be accepted if under 250mS with a maximum of 28V)

1.2.11.2 Over Current Protection

The maximum constant current shall be less than 5A . The adapter shall be auto-recovery

LPS criteria must be fulfilled additionally.

1.2.11.3 Short Circuit protection

Output can be shorted without damage. The adaptor shall be auto-recovery. (It will enter into normal

condition when the fault condition is removed.)

1.2.11.4 Over Temperature Protection

No deformation and no discoloration on case and will be shut down. The case temperature < 95Deg C.

That will be return to normal state by ac reset.

1.2.12 Capacitance load

Plugging a 470uF capacitance to a live adapter, adapter can not shut down.

2. Environmental

2.1 Temperature

2.1.1 Operating

The AC Adapter shall be capable of operating at full load with an ambient temperature range of **0** ℃ **to +40**℃.

2.1.2 Shipping/Storage

The AC Adapter shall be capable of withstanding ambient temperature from **-20**℃ **to +85**℃.

2.2 Humidity

2.2.1 Operating

The AC Adapter shall be capable of operation in relative humidity of **8% to 90%** relative humidity, non-condensing.

2.2.2 Shipping/storage

The AC Adapter shall be capable of withstanding ambient relative humidity of **5% to 90%** relative humidity, non-condensing.

2.3 Immunity

2.3.1 Lightning Surge Immunity

This is to follow the norm of IEC-61000-4-5 Level 3 requirements

L-N 1.5KV/1.2 * 50uS 5 times Performance criteria A or B

L-FG 3KV/1.2 * 50uS 5 times Performance criteria A or B

2.3.2 Electric Fast Transients (EFT)

This is to follow the norm of IEC-61000-4-4/1995

(EN 61000-4-4) Between L and N :1.5KV Performance criteria A or B

Between L /N and PE : 2.5KV Performance criteria A or B

2.4 Electrostatic Discharge (ESD)

This Adapter is capable to withstand ESD test voltage at any point around the enclosure as below.

(Refer to IEC61000-4-2)

±10KV air discharge Performance criteria A or B

±8KV contact discharge Performance criteria A or B

2.5 Dielectric Withstand Voltage (HI – POT)

According to safety agencies audit requirements ;supplier must perfoem full safety tests in production line .

Also EN 50116 must be fulfilled.

Hi pot test : 4242Vdc Leakage detection :150uA Dwell time 2s

ARC detection : most sensitive setting is preferred

2.6 Leakage Current :

The AC leakage current is less than **100 μA** at **264Vac/60Hz**

2.7 Insulation Resistance

The insulation resistance shall be not less than **20M** ohms after application of **500Vdc/10mA for 1 minute**.

2.8 Electromagnetic Interference (EMI)

2.8.1 The adapter shall comply with the following national standards.

(a) CISPR 22 Class B

(b) VCCI Class B

(c) FCC

2.9 MTBF

2.9.1 MTBF(Mean-Time-Between-Failures)Calculation

The calculated MTBF shall be **20000** hours of continuous operation at **25**℃,

maximum load and input voltage. 230Vac

2.10 Surface Temperature rise

Less than 80℃ on the surface @35℃ ambient on wood ,full load and

100Vac input voltage (45℃△T)but no more than 50℃△T at 90Vac is allowed.

△T<=45℃ @100Vac

△T<=50℃ @90Vac

3. Mechanical

3.1 Outline Dimension: 108.0 * 46.0 * 29.5 mm, color: Black

3.2 AC Inlet Type: Socket C8 type

3.3 DC Cable Length: 1800 mm, UL1571, #18 AWG

3.4 DC Connector Dimension:

OD = 5.5 mm

ID = 2.5 mm

LENGTH = 11.75 mm