220W AC-DC Medical Switch Adapter
TR220M Series
APPLICATION NOTE

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TR220M Series

Application Note V11

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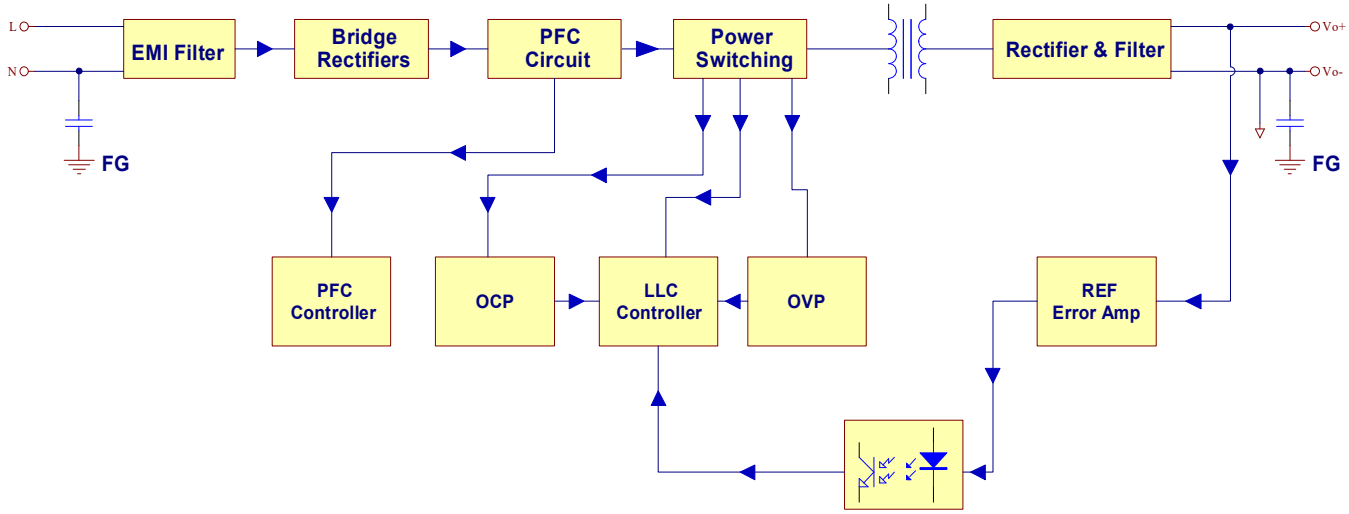
1. Introduction

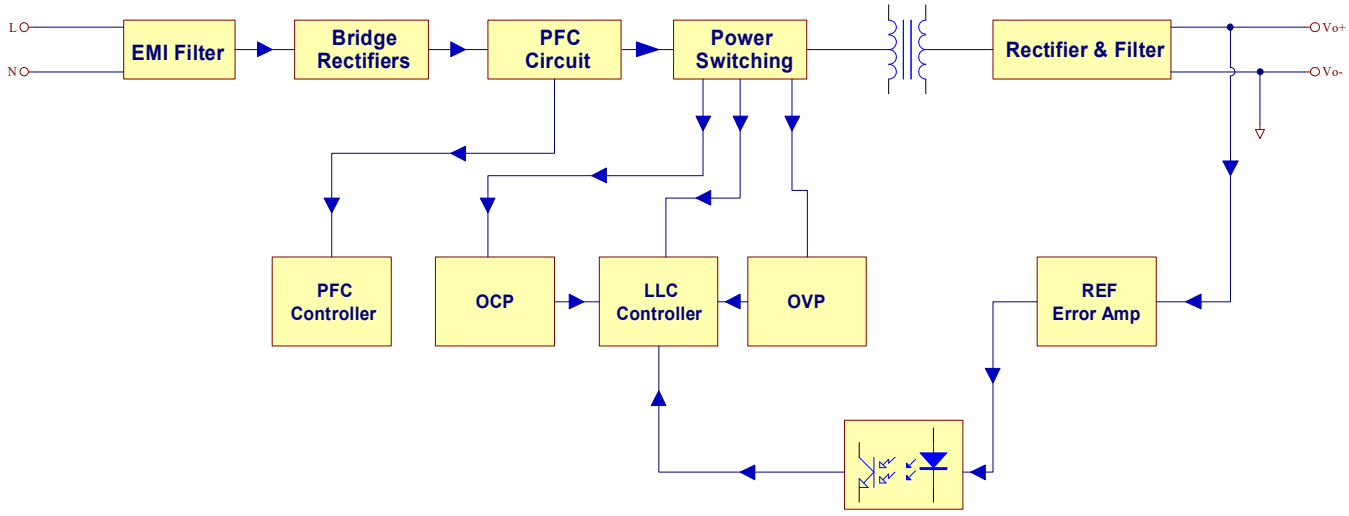
This application note describes the features and functions of Cincon's TR220MA/B series of switch power adapter, These are highly efficient, reliable, compact, high power density, single output AC/DC adapter. The adapter is fully protected against short circuit and over-voltage conditions. Cincon's world class automated manufacturing methods, together with an extensive testing and qualification program, ensure that the TR220MA/B series switch power adapter is extremely reliable.

2. Electrical Block Diagram

TR220MA Series



TR220MB Series



3. Main Features and Functions

3.1 Operating Temperature Range

The highly efficient design of Cincon's TR220MA/B series switch power adapter has resulted in their ability to operate within ambient temperature environments from -30℃ to 70℃.
Due consideration must be given to the de-rating curves when ascertaining the maximum power that can be drawn from the adapter. The maximum power which can be drawn is influenced by a number of factors, such as:

- Input voltage range
- Permissible output load (per derating curve)
- Effective heat sinks

3.2 Output Protection (Over Current Protection)

The adapter provides full continuous short-circuit protection. The unit will auto recover once the short circuit is removed. To provide protection in a fault condition, the unit is equipped with internal over-current protection. The unit will operate normally once the fault condition is removed. The adapter will go to hiccup mode if the output current is set from 120% to 140% of rated current.

4. Applications

4.1 Test Set-Up

The basic test set-up to measure parameters such as efficiency and load regulation is shown in Figure 1. When testing the Cincon's TR220MA/B series under any transient conditions, please ensure that the transient response of the source is sufficient to power the equipment under test. We can calculate the

- Efficiency
- Load regulation and line regulation

The value of efficiency is defined as:

$$\eta = \frac{Vo \times Io}{Pin} \times 100\%$$

Where:

V_o is output voltage
I_o is output current
Pin is input power

The value of load regulation is defined as:

$$Load\ reg1. = \frac{V_{FL} - V_{NL}}{V_{NL}} \times 100\%$$

Where:

V_{FL} is the output voltage at full load
V_{NL} is the output voltage at 60% load

$$Load\ reg2. = \frac{V_{FL} - V_{NL}}{V_{NL}} \times 100\%$$

Where:

V_{FL} is the output voltage at 60% load
V_{NL} is the output voltage at 20% load

The value of line regulation is defined as:

$$Line\ reg. = \frac{V_{HL} - V_{LL}}{V_{LL}} \times 100\%$$

Where:

V_{HL} is the output voltage of maximum input voltage at full load
V_{LL} is the output voltage of minimum input voltage at full load

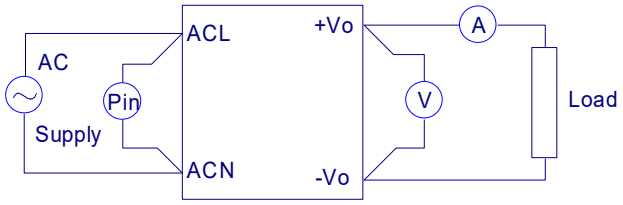


Figure 1. TR220MA/B Series Test Setup

4.2 Output Ripple and Noise Measurement

The test set-up for noise and ripple measurements is shown in Figure 2. Measured method:
Add a C2=0.1uF ceramic capacitor and a C1=10uF electrolytic capacitor to output at 20 MHz Band Width.

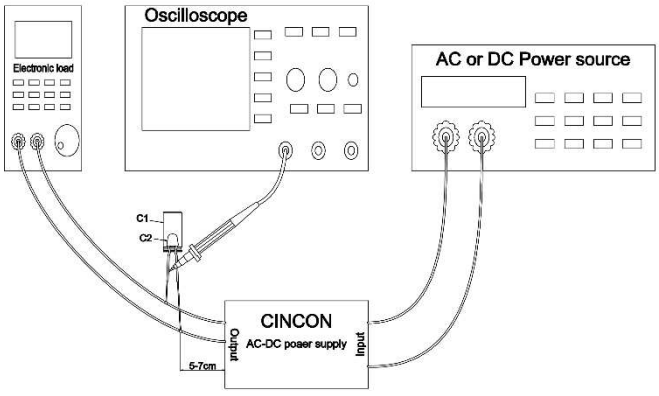
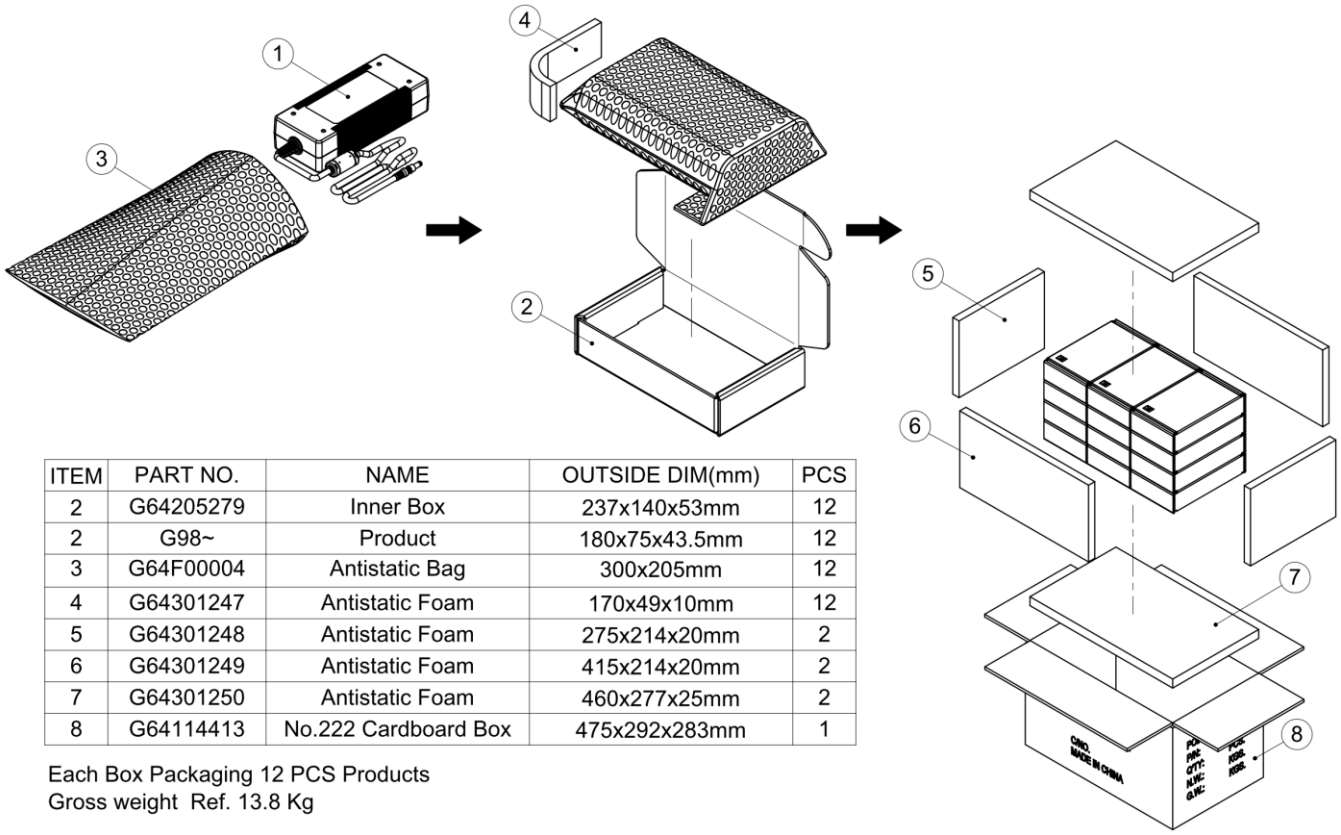


Figure 2. Output Voltage Ripple and Noise Measurement Set up

5. Packing Information

The packing information for TR220MA/B series is showing as follows:



ITEM	PART NO.	NAME	OUTSIDE DIM(mm)	PCS
2	G64205279	Inner Box	237x140x53mm	12
2	G98~	Product	180x75x43.5mm	12
3	G64F00004	Antistatic Bag	300x205mm	12
4	G64301247	Antistatic Foam	170x49x10mm	12
5	G64301248	Antistatic Foam	275x214x20mm	2
6	G64301249	Antistatic Foam	415x214x20mm	2
7	G64301250	Antistatic Foam	460x277x25mm	2
8	G64114413	No.222 Cardboard Box	475x292x283mm	1

Each Box Packaging 12 PCS Products
Gross weight Ref. 13.8 Kg

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