



# TR15RAM Series

## Application Note V10

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<p><b>15W AC-DC MEDICAL INTERCHANGEABLE PLUG ADAPTER TR15RAM Series APPLICATION NOTE</b></p>
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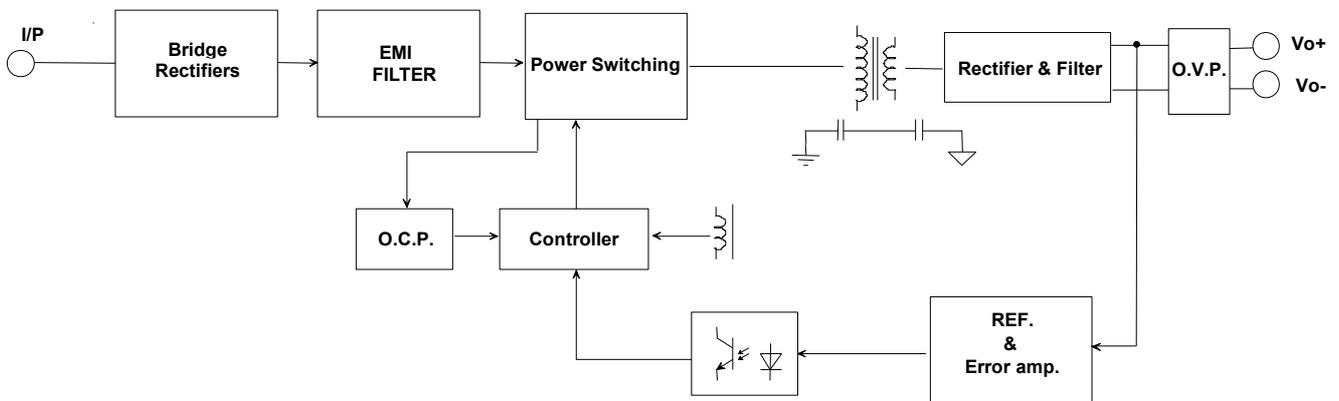
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### 1. Introduction

This application note describes the features and functions of Cincon's TR15RAM series of adapter, switching AC-DC power. These are highly efficient, reliable, compact, high power density, single output AC/DC power. The power 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 TR15RAM series power is extremely reliable.

### 2. Electrical Block Diagram





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### 3. Main Features and Functions

#### 3.1 Operating Temperature Range

The highly efficient design of Cincon's TR15RAM series power has resulted in their ability to operate within ambient temperature environments from 0°C to 70°C. Due consideration must be given to the de-rating curves when ascertaining the maximum power that can be drawn from the power. 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)

#### 3.2 Output Protection

All different voltage models have a 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 operates normally once the fault condition is removed. The power module will supply up to 110% - 160% of rated current. In the event of an over current converter will go into a hiccup mode protection.

### 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 TR15RAM 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:

$$\eta = \frac{V_o \times I_o}{P_{in}} \times 100\%$$

Where:

- Vo is output voltage,
- Io is output current,
- Pin is input power

The value of load regulation is defined as:

$$Load\ reg\ 1. = \frac{V_{FL} - V_{NL}}{V_{NL}} \times 100\%$$

Where:

- V<sub>FL</sub> is the output voltage at 100% full load
- V<sub>NL</sub> is the output voltage at 60% load

$$Load\ reg\ 2. = \frac{V_{FL} - V_{NL}}{V_{NL}} \times 100\%$$

Where:

- V<sub>FL</sub> is the output voltage at 60% load
- V<sub>NL</sub> 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<sub>HL</sub> is the output voltage of maximum input voltage at 100% full load
- V<sub>LL</sub> is the output voltage of minimum input voltage at 100% full load

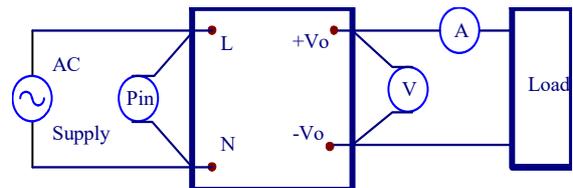


Figure 1. TR15RAM Series Test Setup

#### 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 C1: 10uF electrolytic capacitor and a C2: 0.1uF ceramic capacitor to output at 20 MHz Band Width.

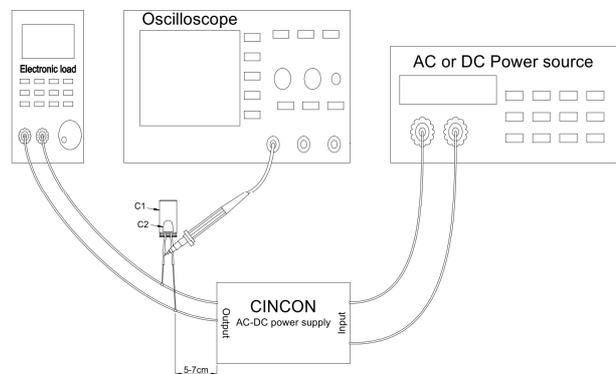


Figure 2. Output Voltage Ripple and Noise Measurement Set-Up

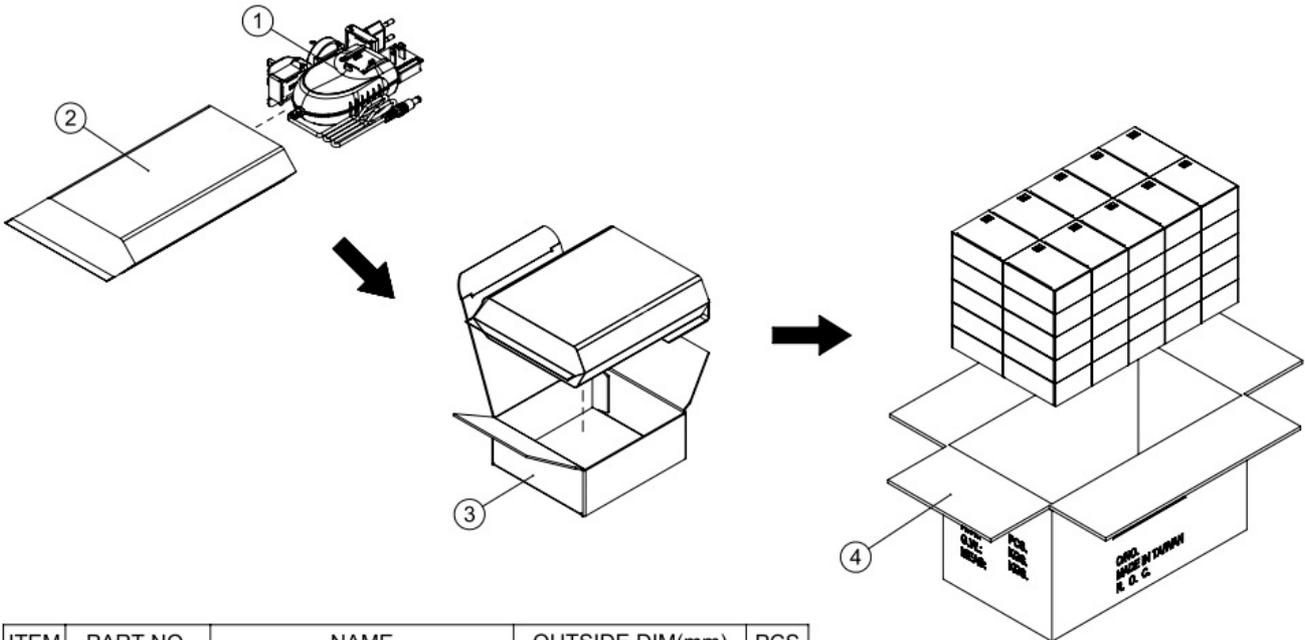


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### 5. Packing Information

The packing information for TR15RAM series is showing as follows:



ITEM	PART NO.	NAME	OUTSIDE DIM(mm)	PCS
1		TR15RAMXXX (with Plug)		50
2	G64D15057	Plastic Bag	245x155x0.08	50
3	G64205245	Inner Box	140x100x55	50
4	G64102181	No.81 Cardboard Box	533.3x296.9x312.1	1

Each Box Packaging 50PCS Products  
Gross weight Ref. 13.5Kg

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