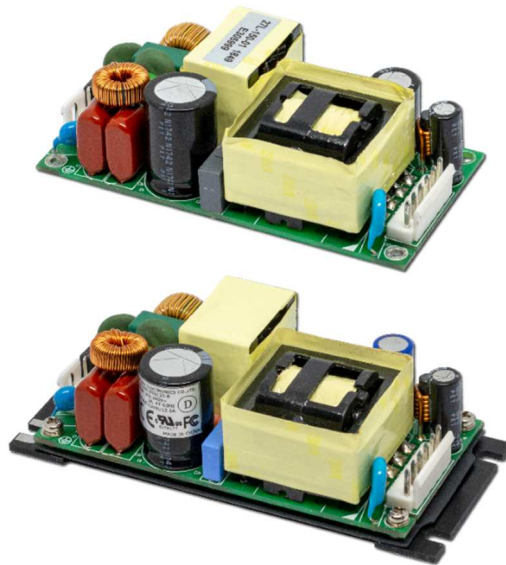




CFM150S Series Application Note V14

150W AC-DC Power Supply with PFC CFM150S Series APPLICATION NOTE



Approved By:

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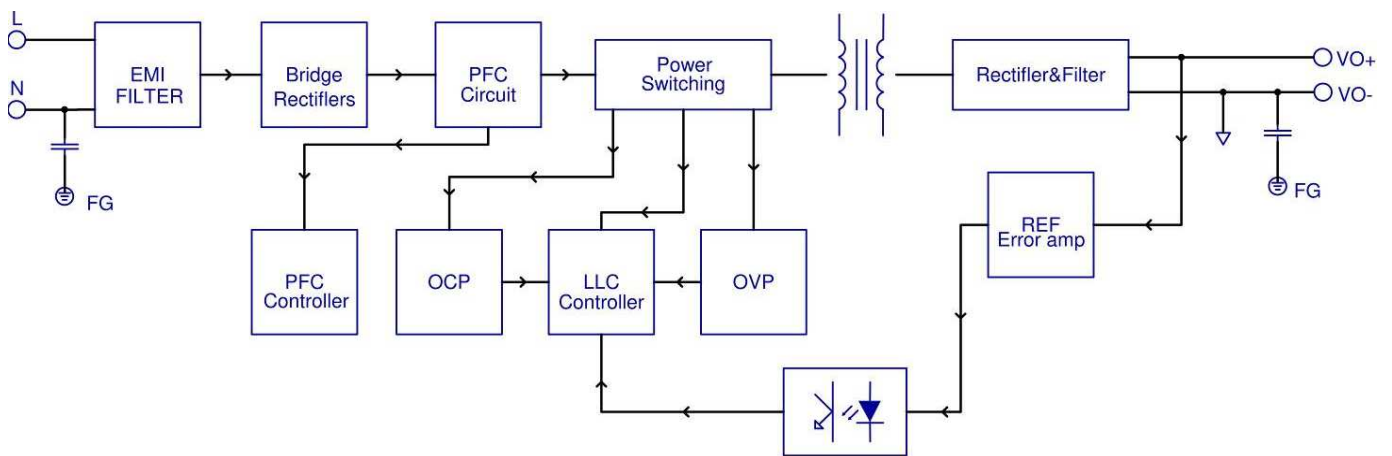
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1. Introduction

This application note describes the features and functions of Cincon's CFM150S series of open frame, switching AC-DC power module. These are highly efficient, reliable, compact, high power density, single output AC/DC power modules. The module 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 CFM150S series power module 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 CFM150S series power modules has resulted in their ability to operate within ambient temperature environments from -30°C to 80°C (40°C can be start up at full load). Due consideration must be given to the derating curves when ascertaining the maximum power that can be drawn from the module. The maximum power which can be drawn is influenced by a number of factors, such as (40°C~70°C with 2.5%/°C de-rating).

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

3.2 Output Protection (Over Current Protection)

The power modules provide 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 power module will go to hiccup mode if CFM150SXXX-B output current is set from 120% to 140% of rated current and CFM150SXXX output current is set from 150% to 170% 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 CFM150S 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:

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

Where:

- V_{FL} is the output voltage at full load
- V_{NL} is the output voltage at 10% 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.

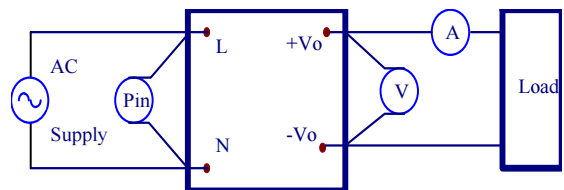


Figure 1. CFM150S Series Test Setup

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.

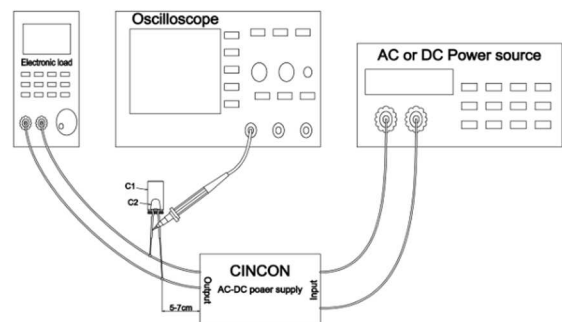


Figure 2. Output Voltage Ripple and Noise Measurement Set-Up

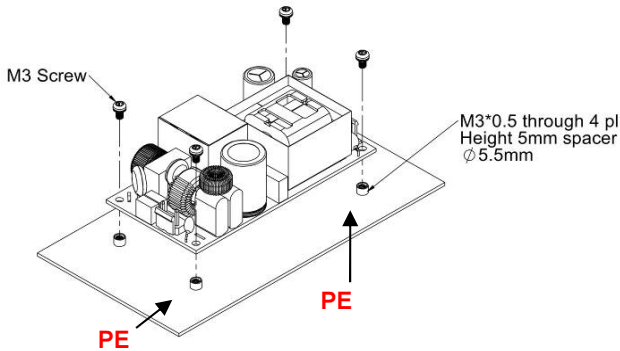
4.3 Installation Instruction

The CFM150S series has four 3.2mm diameter mounting holes. There are three type installations for CFM150S & CFM150S-B. Please use the mounting holes as follows: Insert the spacer (5.5mm diameter max.) of 5mm height or more to mount the unit.



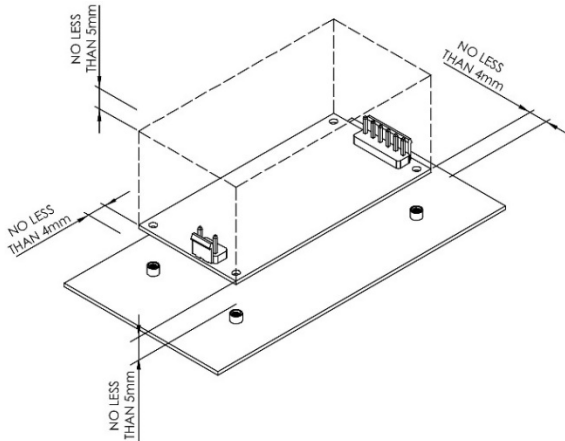
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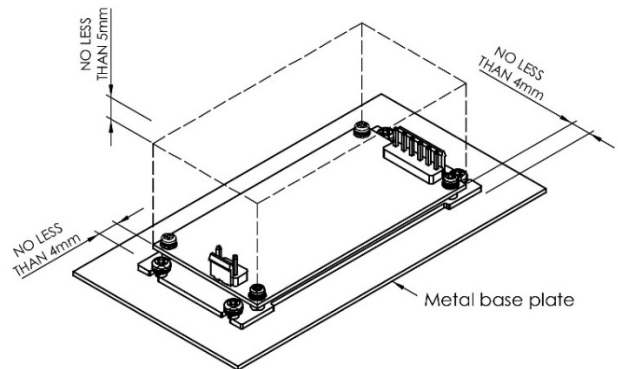
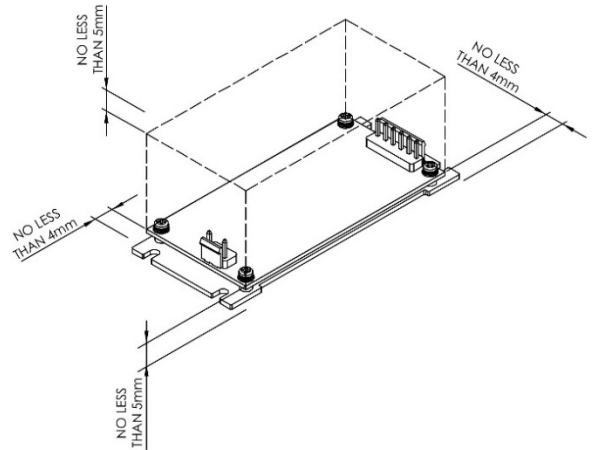
CFM150SXXX Installation Diagram

Note:
M3 screw head and washer diameter shall not exceed 5.5mm.



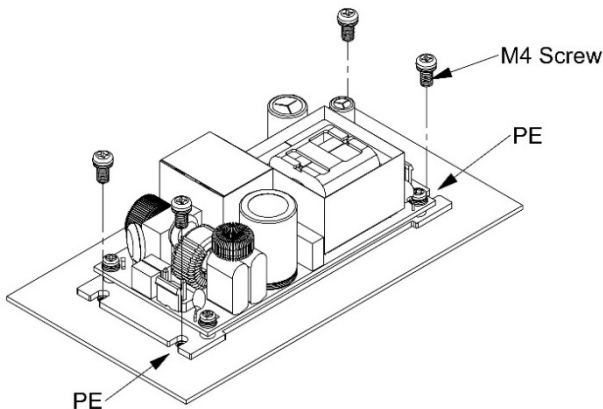
Please allow 4mm side clearance from the components and all side of the PCB. Allow 5mm clearance above the highest parts on the PCB. Be especially careful to allow 5mm between the solder side of the PCB and the mounting surface. If the clearances are not sufficient the specifications for isolation and withstand will not be valid. The CFM150S-B series provide the baseplate cooling for customer to increasing heat dissipation. Please refer to the following figure for installation.

Note:
M4 screw head and washer diameter shall not exceed 5.5mm. Please allow 4mm side clearance from the components and all side of the PCB. Allow 5mm clearance above the highest parts on the PCB. Be especially careful to allow 5mm between the solder side of the PCB and the mounting surface. If the clearances are not sufficient the specifications for isolation and withstand will not be valid.



Base Cooling Setup

PE should be connected to the earth (ground) terminal of the apparatus. If not the conducted noise and output noise will increase.



CFM150SXXX-B installation diagram



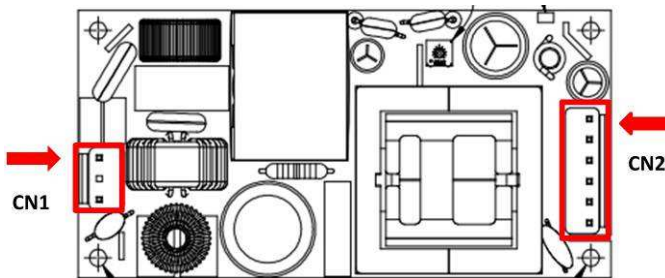
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4.4 EMI Test

The CFM150S series Conduction EMI meets EN55032 Class B when test condition is Class I & Class II.
Radiation meet EN55032 Class B when test condition is Class I for heavy industry & light industry.
Radiation meet EN55032 Class A when test condition is Class II for heavy industry.

4.5 Mating Connectors



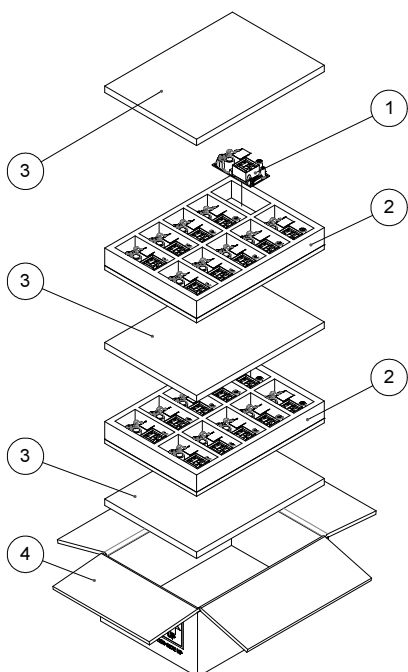
AC Input (CN1)	Wafer: TAIWAN KING PIN TERMINAL PVHI series or equivalent.
DC Output (CN2)	Housing: JST VHR series or equivalent.



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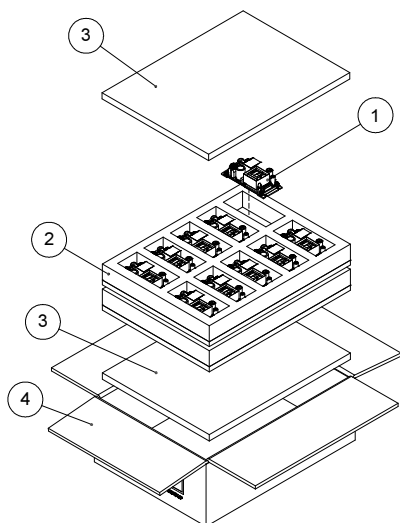
5. Packing Information



ITEM	PART NO.	NAME	OUTSIDE DIM(mm)	PCS
1	-	CFM150SXXX Product	101.6x50.8x32.6	20
2	G64301170	Antistatic Foam	340x245x50	2
3	G64308319	Antistatic Foam	340x245x15	3
4	G64112339	No.59 Cardboard Box	360.6x257.6x148.5	1

Each Box Packaging 20 PCS Products
Gross weight Ref. 5 Kg

The packing information for CFM150S-B series is showing as follows:



ITEM	PART NO.	NAME	OUTSIDE DIM(mm)	PCS
1	-	CFM150SXXX-B Product	116.8x50.8x34.6	20
2	G64301206	Antistatic Foam	390x295x50	2
3	G64301207	Antistatic Foam	390x295x15	2
4	G64112284	No.106 Cardboard Box	412.1x309.1x148.5	1

Each Box Packaging 20 PCS Products
Gross weight Ref. 5.7 Kg

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