



# CFM130M Series

## Application Note V14

### 130W AC-DC Power Supply with PFC CFM130M Series APPLICATION NOTE



**Approved By:**

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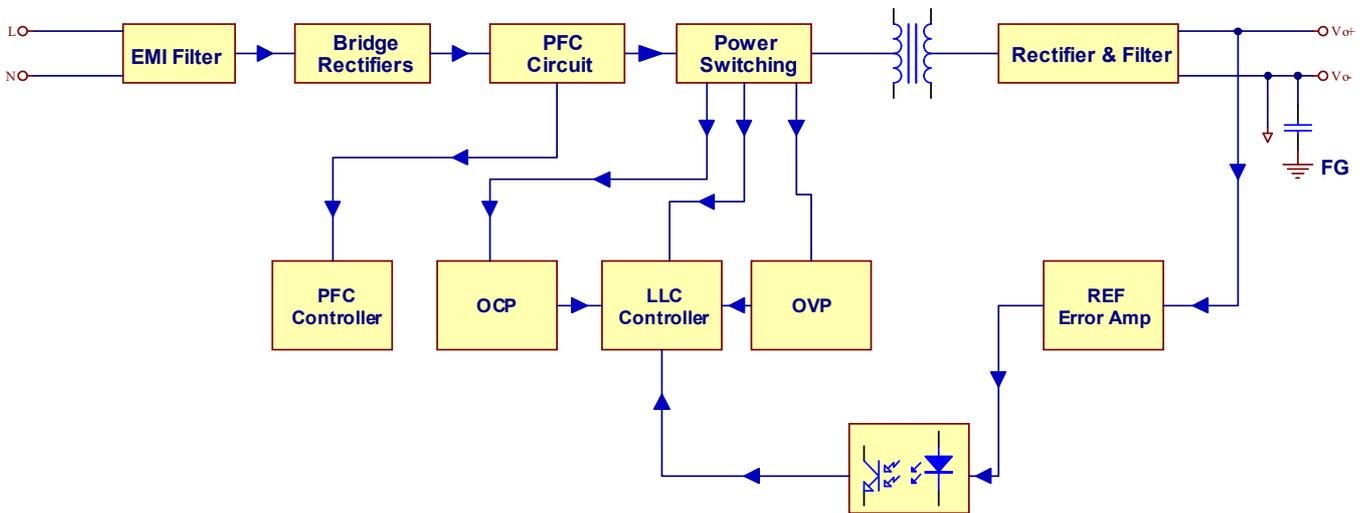
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### 1. Introduction

This application note describes the features and functions of Cincon's CFM130M 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 CFM130M 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 CFM130M series power modules has resulted in their ability to operate within ambient temperature environments from -30°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 module. 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 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 the output current is set from 115% to 145% 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 CFM130M 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:

- $V_o$  is output voltage
- $I_o$  is output current
- $P_{in}$  is input power

The value of load regulation is defined as:

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

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:

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

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

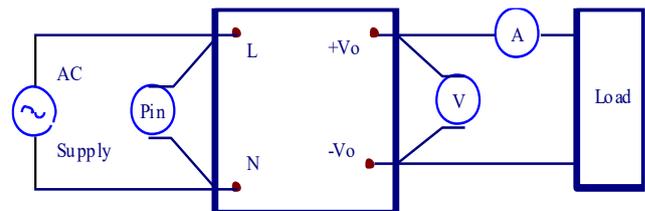


Figure 1. CFM130M Series Test Setup

#### 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.

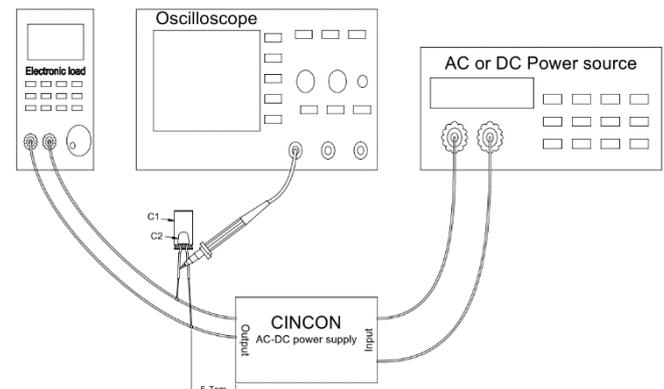


Figure 2. Output Voltage Ripple and Noise Measurement Set-Up

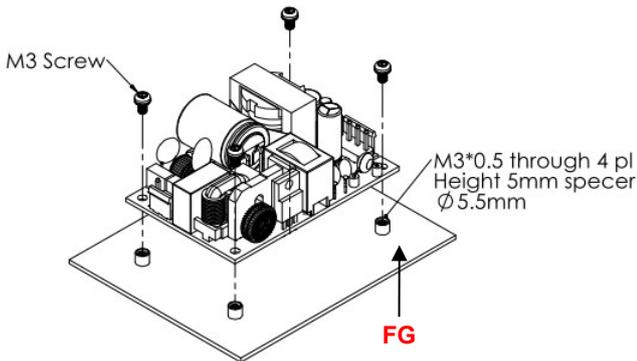


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### 4.3 Installation Instruction

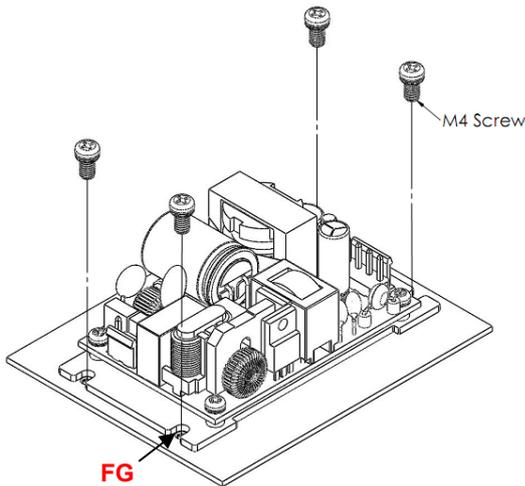
The CFM130M series has four 3.2mm diameter mounting holes. There are three type installations for CFM130M. Please use the mounting holes as follows: Insert the spacer (5.5mm diameter max.) of 5mm height or more to mount the unit.



**CFM130MXXX Installation Diagram**

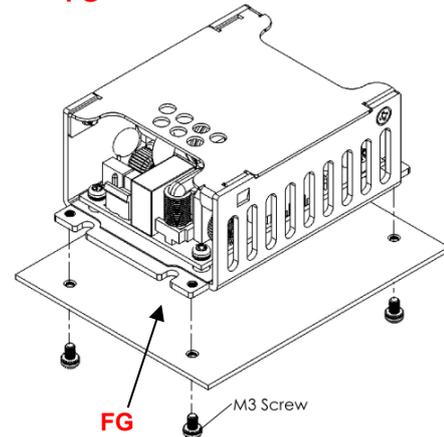
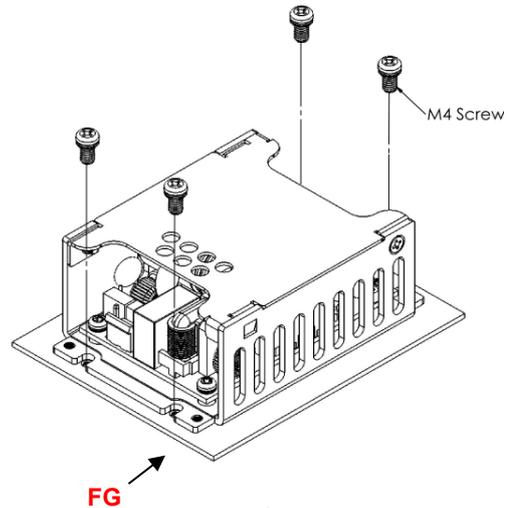
Note:  
M3 screw head and washer diameter shall not exceed 5.5mm.

The CFM130M series provide the baseplate cooling for customer to increasing heat dissipation. Please refer to the following figure for installation.



**CFM130MXXX-B installation diagram**

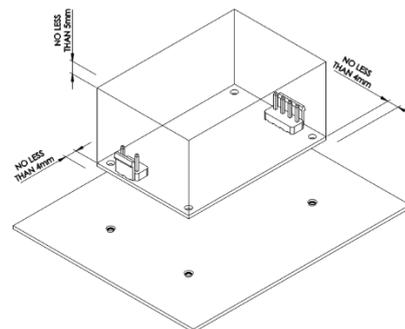
Note:  
M4 screw head and washer diameter shall not exceed 5.5mm.



**CFM130MXXX-C installation diagram**

Note:  
M3&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.



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



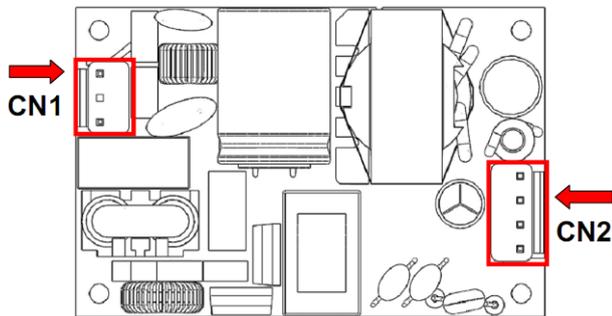
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### 4.4 EMI Test

The CFM130M series Conductive EMI meets EN55011 Class B when test condition is Class I & Class II.  
Radiation meet EN55011 Class B when test condition is Class I.  
Radiation meet EN55011 Class A when test condition is Class II.

### 4.5 Mating Connectors



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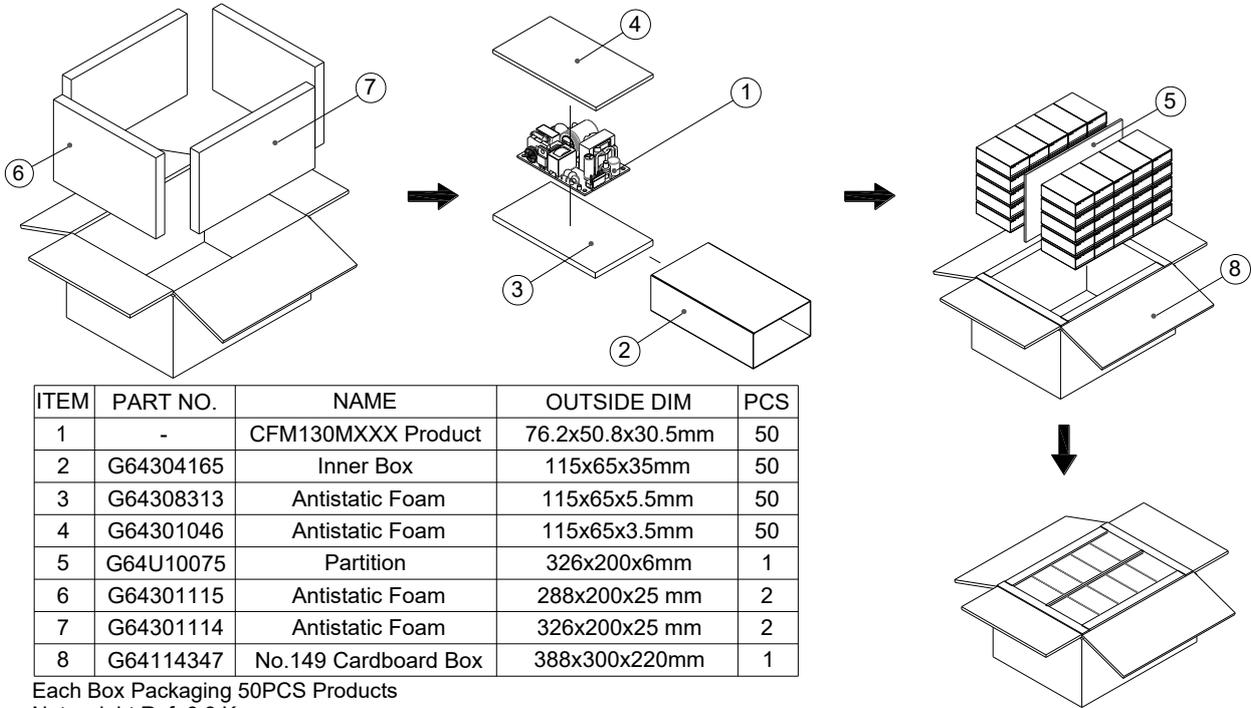


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### 5. Packing Information

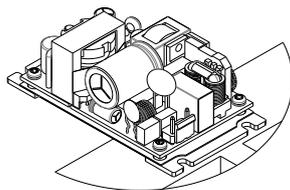
The packing information for CFM130MXXX series is showing as follows:



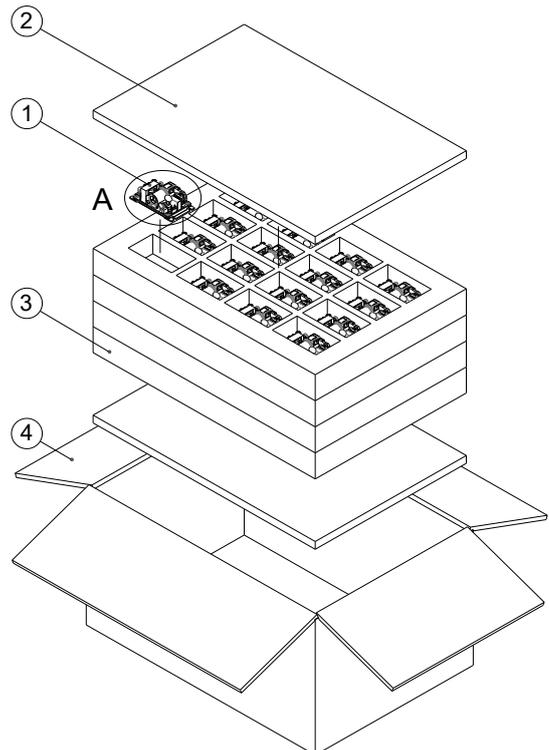
ITEM	PART NO.	NAME	OUTSIDE DIM	PCS
1	-	CFM130MXXX Product	76.2x50.8x30.5mm	50
2	G64304165	Inner Box	115x65x35mm	50
3	G64308313	Antistatic Foam	115x65x5.5mm	50
4	G64301046	Antistatic Foam	115x65x3.5mm	50
5	G64U10075	Partition	326x200x6mm	1
6	G64301115	Antistatic Foam	288x200x25 mm	2
7	G64301114	Antistatic Foam	326x200x25 mm	2
8	G64114347	No.149 Cardboard Box	388x300x220mm	1

Each Box Packaging 50PCS Products  
 Net weight Ref. 6.8 Kg  
 Gross Weight Ref. 8.3Kg

The packing information for CFM130MXXX-B series is showing as follows:



Detail Enlargement A



ITEM	PART NO.	NAME	OUTSIDE DIM(mm)	PCS
1	-	CFM130MXXX-B Product	91.4x50.8x33.06mm	64
2	G64301208	Antistatic Foam	485x330x15mm	2
3	G64301209	Antistatic Foam	485x330x50mm	4
4	G64100099	No.49 Cardboard Box	500x345x260mm	1

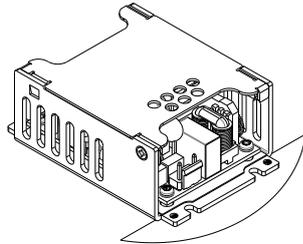
Each Box Packaging 64 PCS Products  
 Net weight Ref. 10.88 Kg  
 Gross weight Ref. 12.38 Kg



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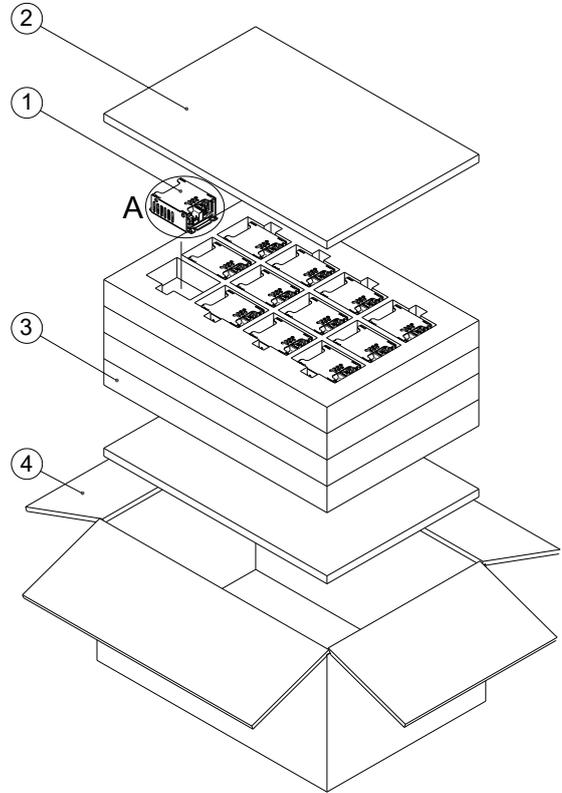
The packing information for CFM130MXXX-C series is showing as follows:



Detail Enlargement A

ITEM	PART NO.	NAME	OUTSIDE DIM(mm)	PCS
1	-	CFM130MXXX-C Product	91.4x64x34.5mm	48
3	G64301210	Antistatic Foam	485x330x50mm	4
2	G64301208	Antistatic Foam	485x330x15mm	2
4	G64100099	No.49 Cardboard Box	500x345x260mm	1

Each Box Packaging 48 PCS Products  
 Net weight Ref. 10.464 Kg  
 Gross weight Ref. 11.964 Kg



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