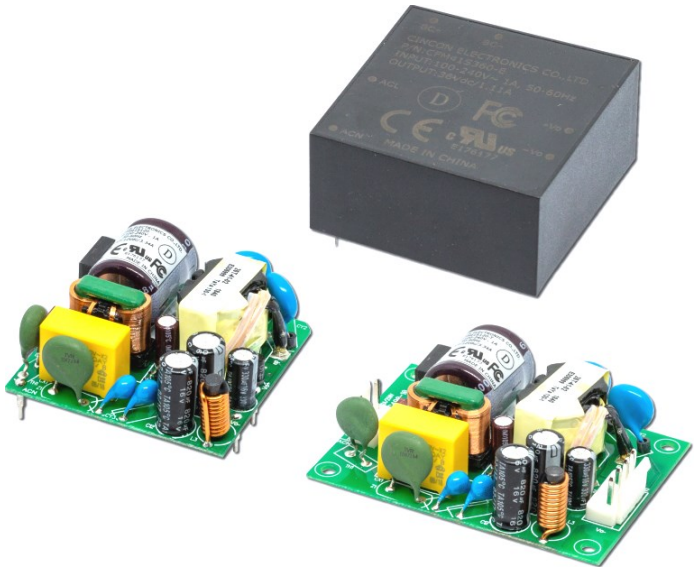
40W AC-DC Switching Power Module
CFM41S Series
APPLICATION NOTE



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CFM41S Series

Application Note V16

Content

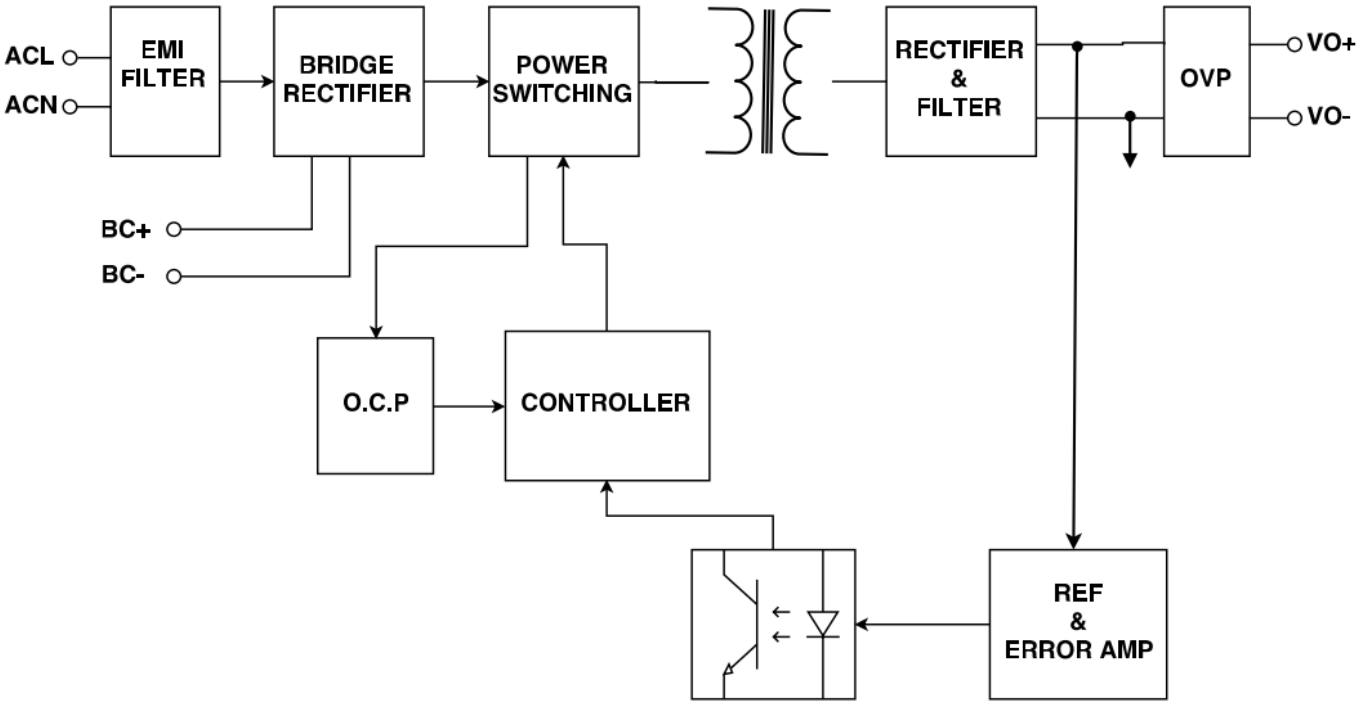
CFM41S Series

Application Note V16

1. Introduction

This application note describes the features and functions of Cincon's CFM41S 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 CFM41S series power module is extremely reliable.

2. Electrical Block Diagram



3. Main Features and Functions

3.1 Operating Temperature Range

The highly efficient design of Cincon's CFM41S series power modules has resulted in their ability to operate within ambient temperature environments from -40°C to 85°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:

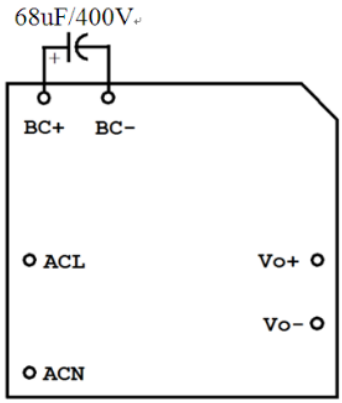
- Input voltage range
- Permissible output load (per derating curve)

3.2 Output Protection (Over Current Protection)

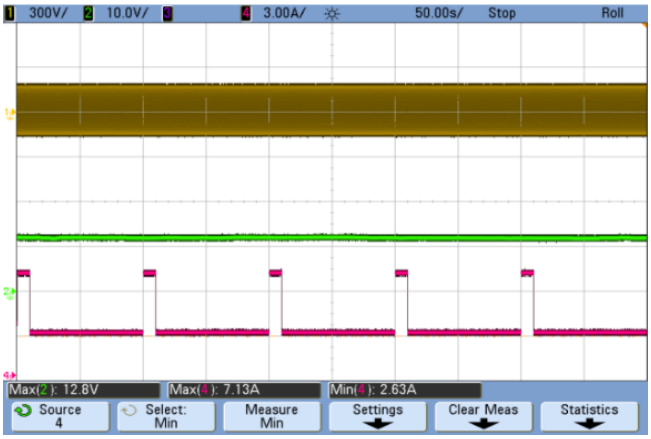
The power modules provide full continuous short-circuit protection. The unit will auto recover once the short circuit is removed. To provide protection in a fault condition, the unit is equipped with internal over-current protection. The unit will operate normally once the fault condition is removed.

3.3 Peak Load Function

CFM41SXXX and CFM41SXXX-E has a very powerful peak load function which can provide twice the rated power. However, the duration of the peak load should be less than 10 seconds, with a maximum 10% duty cycle and must externally add a 68uF/400V capacitor to BC+ & BC-, but this is not needed when input is exceed to 200V_{ac}.

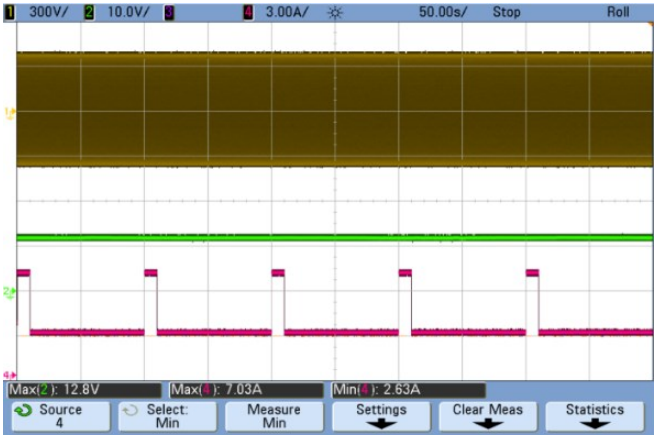


V_{in}=90V_{ac} & 115V_{ac} & 230V_{ac} & 264V_{ac}
Peak Load Function by 200% Load 10S & 80% Load 90S



CH1: V_{in}, CH2: V_{out}, CH4: I_{out}
Average Power: 36.87W
Add External 68uF/400V Capacitor to BC+ & BC-

V_{in}=230V_{ac} & 264V_{ac}
Peak Load Function by 200% Load 10S & 80% Load 90S



CH1: V_{in} CH2: V_{out} CH4: I_{out}
Average Power: 36.87W

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 CFM41S 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:

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

Where:

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

The value of load regulation is defined as:

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

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

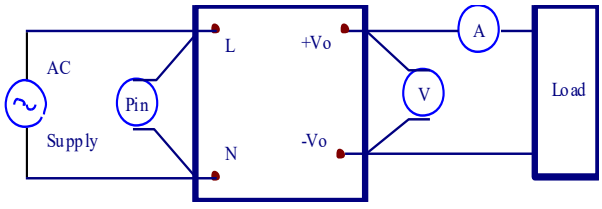


Figure 1. CFM41S Series Test Setup

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 0.1 uF ceramic capacitor and a 10 uF electrolytic capacitor to output at 20 MHz Band Width.(CFM41S050: Add a 0.1uF ceramic capacitor and a 47uF aluminum electrolytic capacitor to output.)

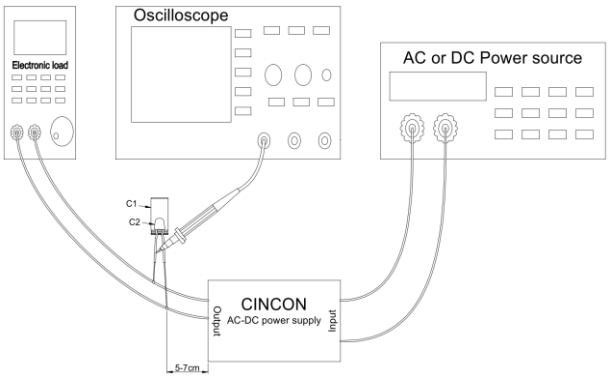
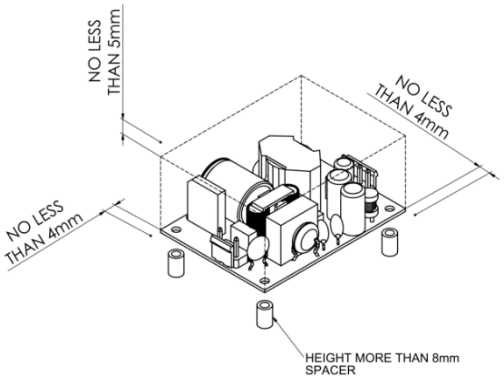


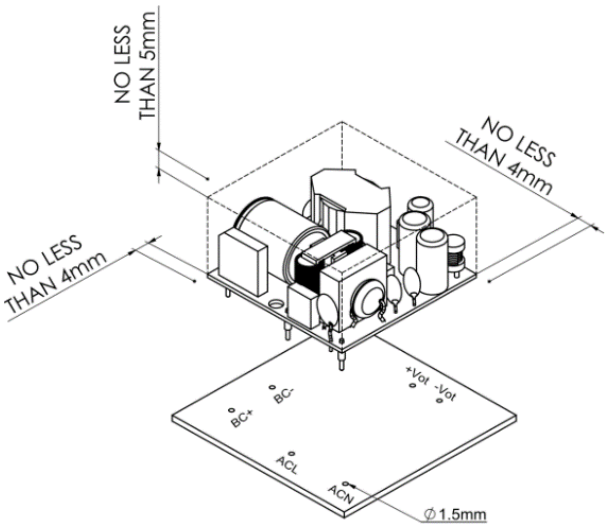
Figure 2. Output Voltage Ripple and Noise Measurement Set up

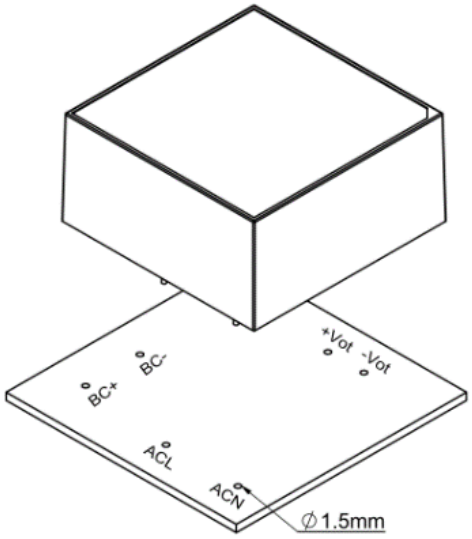
4.3 Installation Instruction

The CFM41SXXX-T has four 3.2mm diameter mounting holes. Please use the mounting holes as follows:
Insert the spacer (6mm diameter max.) of 8mm height or more to mount the unit. The vibration specification applies when the unit is mounted on 8mm spacers. 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 8mm 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 CFM41SXXX and CFM41SXXX-E mounting holes are 1.5mm. Please allow 4mm side clearance from the components and all side of the PCB and CASE. Allow 5mm clearance above the highest parts on the PCB and CASE.

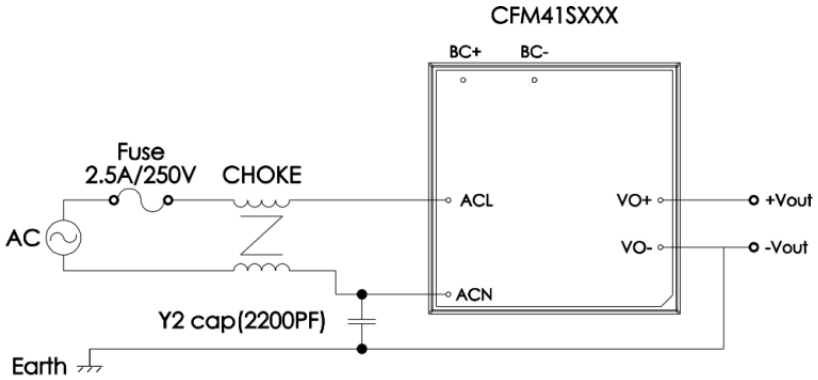




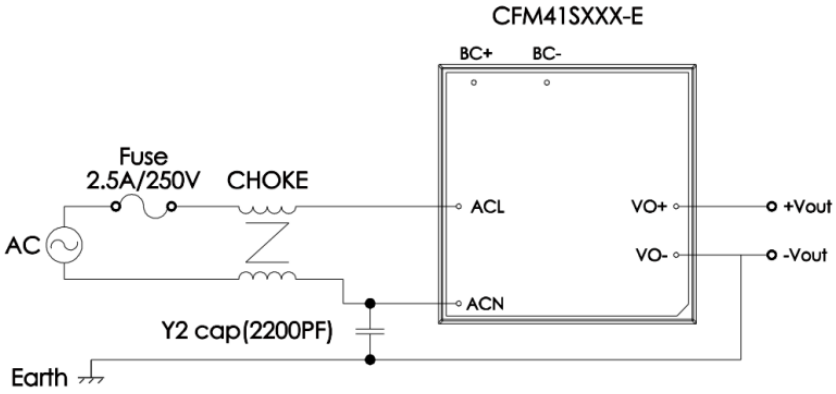
4.4 Class I EMI Solution

The CFM41S series need additional inductance and YCap to meet EN55032 CLASS B when test condition is Class I.If customers use in Class II systems, please ignore this section.

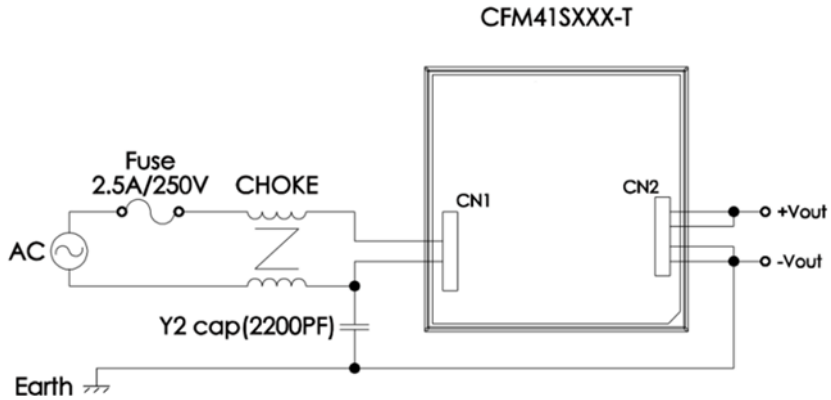
CFM41SXXX



CFM41SXXX-E



CFM41SXXX-T



Additional Inductance Related Parameters:

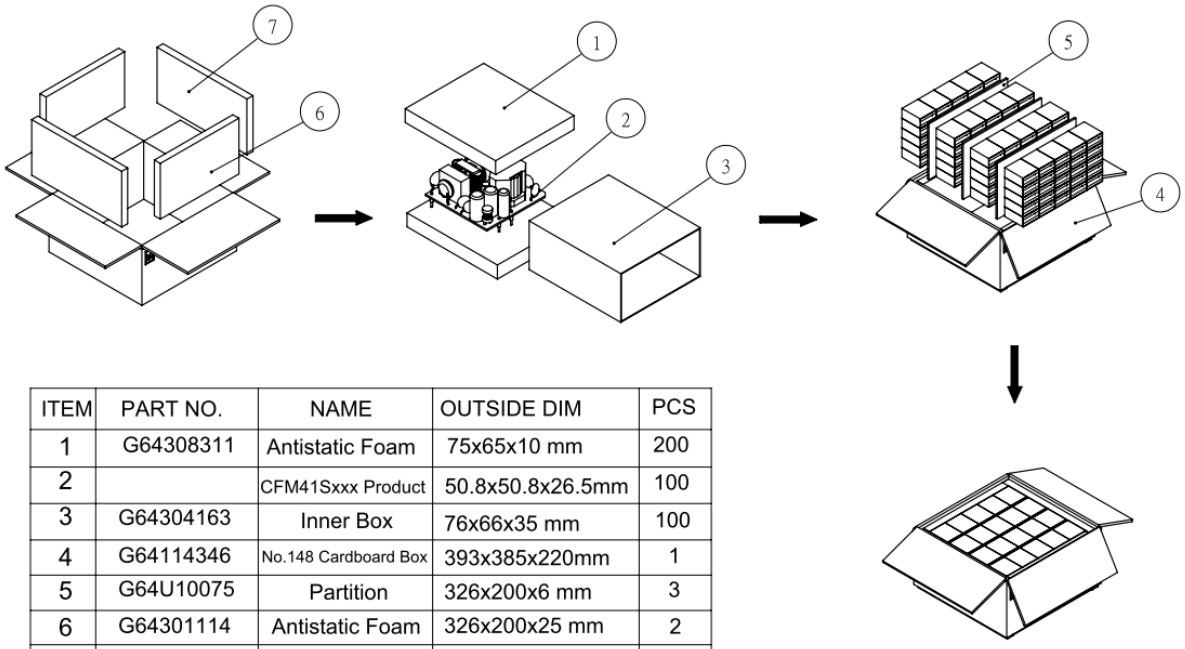
Specification	Inductance	Duplex Winding /turns	Manufacturers
T10*6*5C R15K	3.34mH	TEX-E Φ0.35*2/25T	VAKOS

Additional Safety YCap Related Parameters:

Subclass	WITHSTANDVOLTAGE	Capacitance	Manufacturers
Y2 CAP	250V(min)	2200pF(typ.)	TDK

5. Packing Information

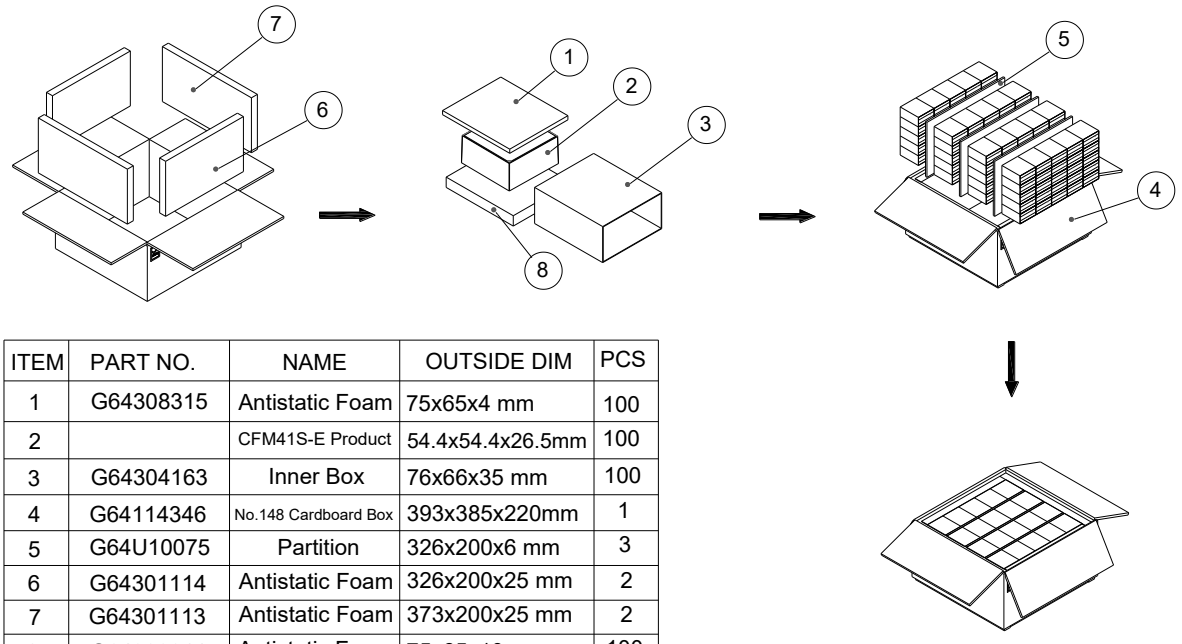
The packing information for CFM41SXXX series is showing as follows:



ITEM	PART NO.	NAME	OUTSIDE DIM	PCS
1	G64308311	Antistatic Foam	75x65x10 mm	200
2		CFM41Sxxx Product	50.8x50.8x26.5mm	100
3	G64304163	Inner Box	76x66x35 mm	100
4	G64114346	No.148 Cardboard Box	393x385x220mm	1
5	G64U10075	Partition	326x200x6 mm	3
6	G64301114	Antistatic Foam	326x200x25 mm	2
7	G64301113	Antistatic Foam	373x200x25 mm	2

Each Box Packaging 100 PCS Products
Gross weight Ref. 7.7Kg
Net weight Ref. 6.7Kg

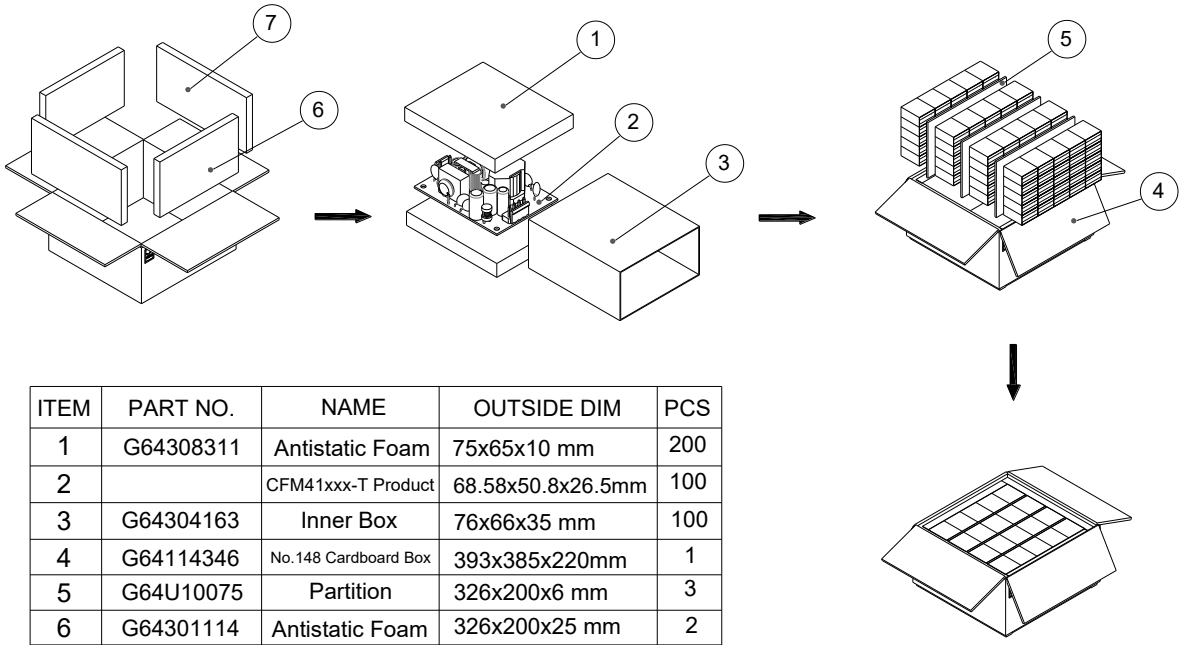
The packing information for CFM41SXXX-E series is showing as follows:



ITEM	PART NO.	NAME	OUTSIDE DIM	PCS
1	G64308315	Antistatic Foam	75x65x4 mm	100
2		CFM41S-E Product	54.4x54.4x26.5mm	100
3	G64304163	Inner Box	76x66x35 mm	100
4	G64114346	No.148 Cardboard Box	393x385x220mm	1
5	G64U10075	Partition	326x200x6 mm	3
6	G64301114	Antistatic Foam	326x200x25 mm	2
7	G64301113	Antistatic Foam	373x200x25 mm	2
8	G64308311	Antistatic Foam	75x65x10 mm	100

Each Box Packaging 100 PCS Products
Gross weight Ref. 15.5Kg
Net weight Ref. 14.5Kg

The packing information for CFM41SXXX-T series is showing as follows:



ITEM	PART NO.	NAME	OUTSIDE DIM	PCS
1	G64308311	Antistatic Foam	75x65x10 mm	200
2		CFM41xxx-T Product	68.58x50.8x26.5mm	100
3	G64304163	Inner Box	76x66x35 mm	100
4	G64114346	No.148 Cardboard Box	393x385x220mm	1
5	G64U10075	Partition	326x200x6 mm	3
6	G64301114	Antistatic Foam	326x200x25 mm	2
7	G64301113	Antistatic Foam	373x200x25 mm	2

Each Box Packaging 100 PCS Products
Gross weight Ref. 8Kg
Net weight Ref. 7Kg

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