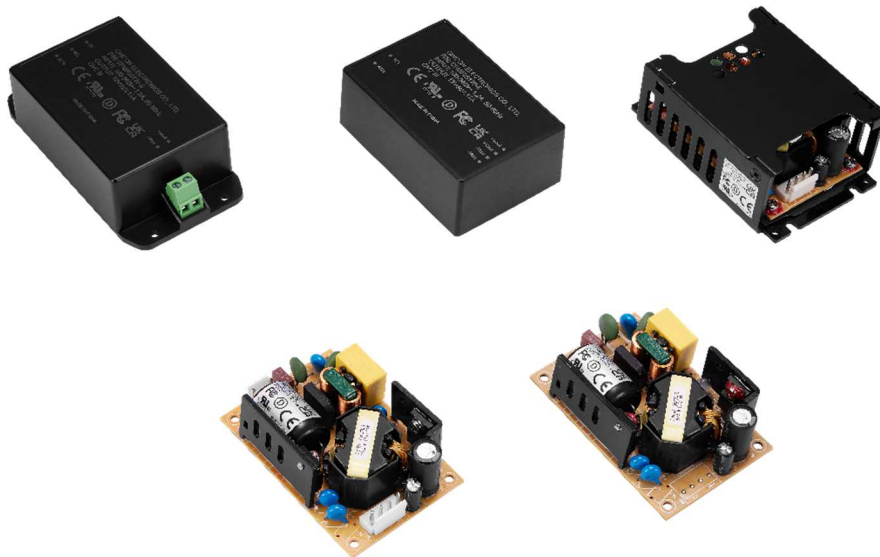




CFM50S Series Application Note V12

AC-DC Switching Power Module CFM50S Series APPLICATION NOTE



Approved By:

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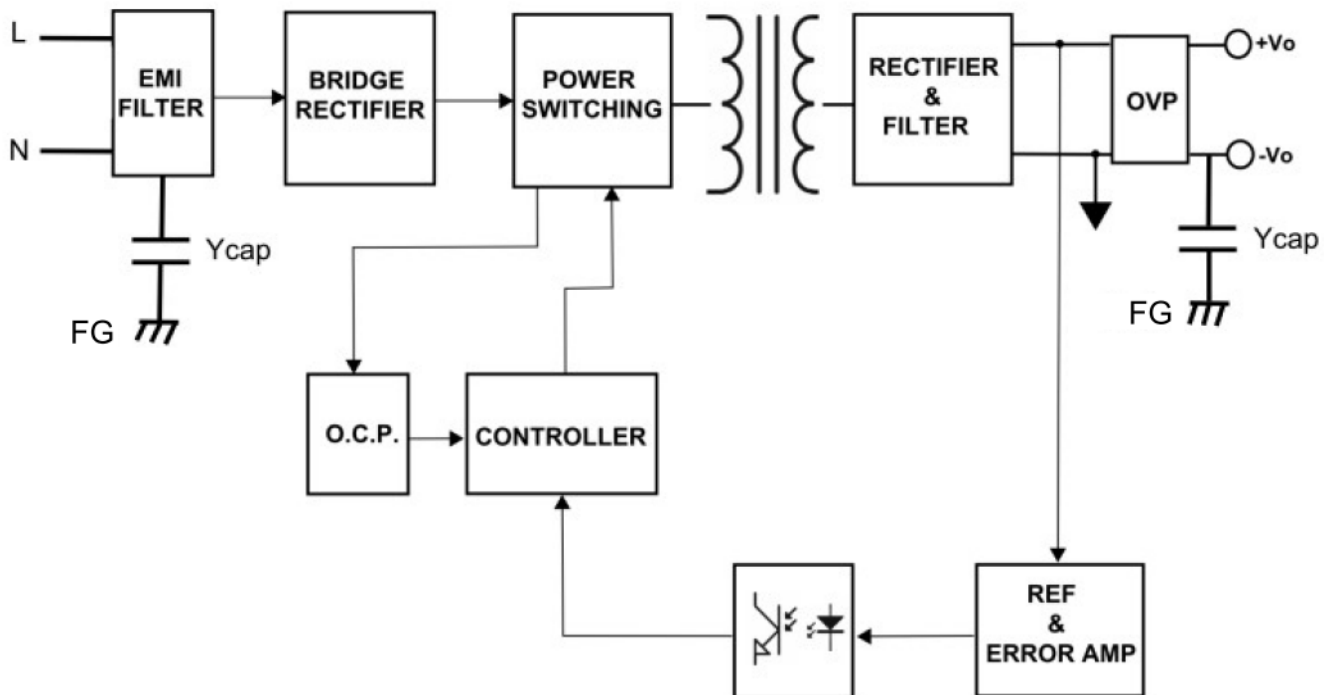
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1. Introduction

The application note describes the features, functions, installation, and package information of CFM50S, an AC/DC open frame switching power supply. CFM50S has 5 different packages (Case, Wafer, Encapsulated, screw terminal, and PCB mount version) and is suitable for both Class I & Class II and OVCII & OVCI applications. This power supply is designed with fully protected functions and qualification process with high reliability.

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 CFM50S 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. 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

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.

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 CFM50S 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:

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

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.

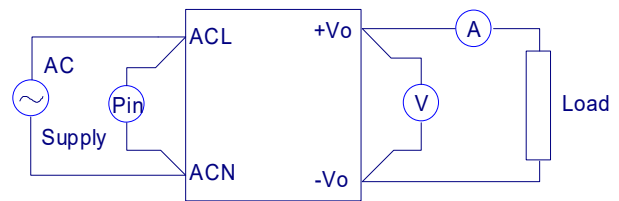


Figure 1. CFM50S Series Test Setup

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.

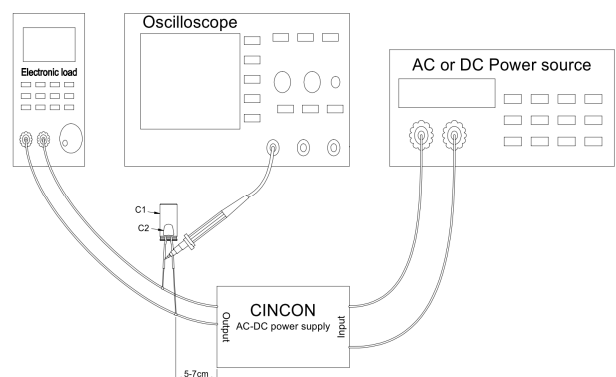


Figure 2. Output Voltage Ripple and Noise Measurement Set-Up



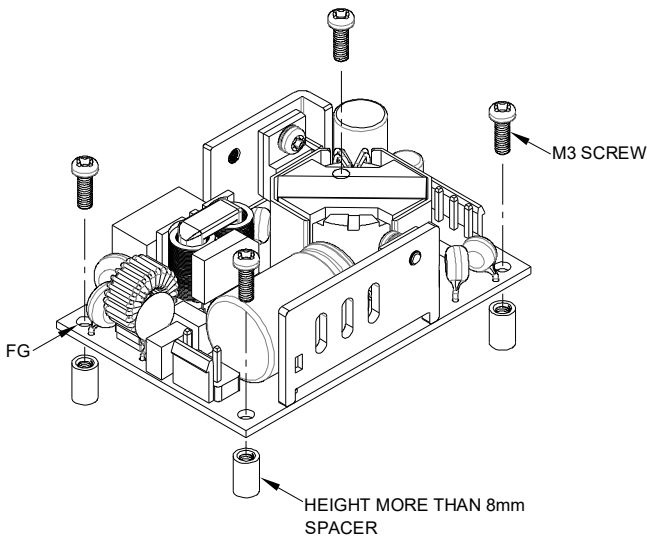
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4.3 Installation Instruction

4.3.1 Mounting Hole Installation

CFM50S series: 4 holds of $\Phi 3.17$ and insert the spacer (Max $\Phi 6$) of height over 8mm to lift the unit. The vibration spec. is the value take when the unit is raised by 8mm spacers.

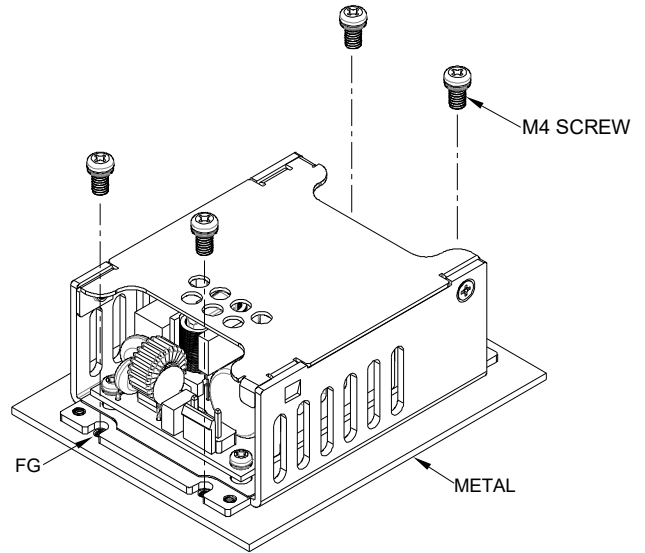
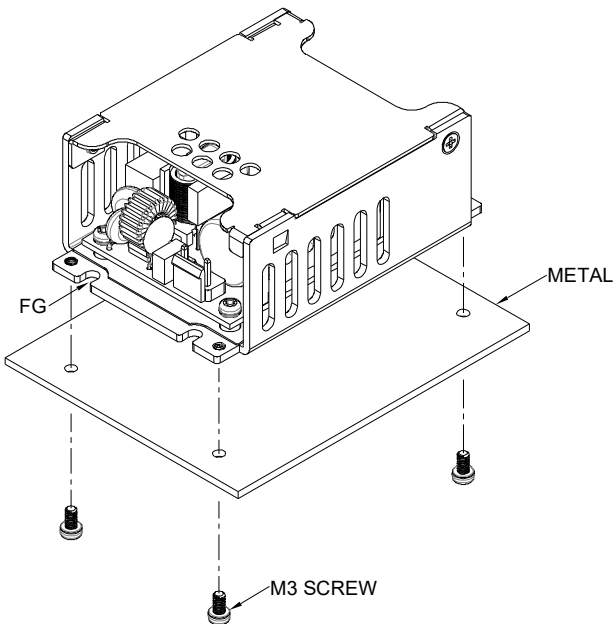


CFM50SXXX installation diagram

Note:

Recommended torque value of M3 threaded hole: 4kgf-cm (Max.)

CFM50SXXX-CA has two directions to tighten the screws. Please refer to the following figure for installation.



CFM50SXXX-CA installation diagram

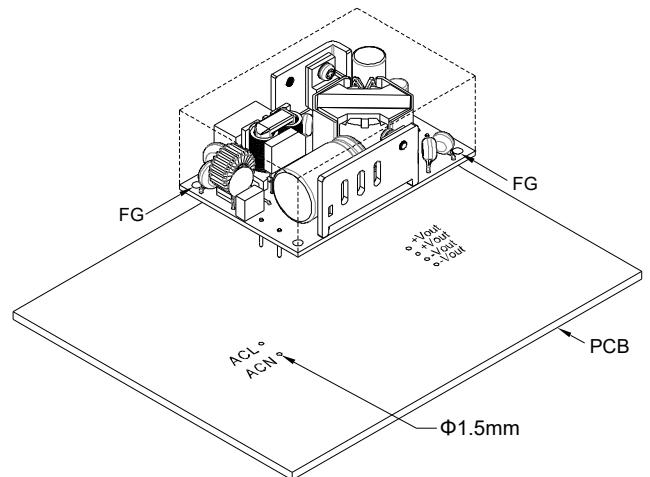
Note1:

M3&M4 screw head and washer diameter shall not exceed 5.5mm

Note2:

Recommended torque value of M3 threaded hole: 4kgf-cm (Max.), M4 threaded hole: 9.7 kgf-cm (Max.)

CFM50SXXX-P mounting holes are 1.5mm. Input and output should solder on pcb board.



CFM50SXXX-P installation diagram

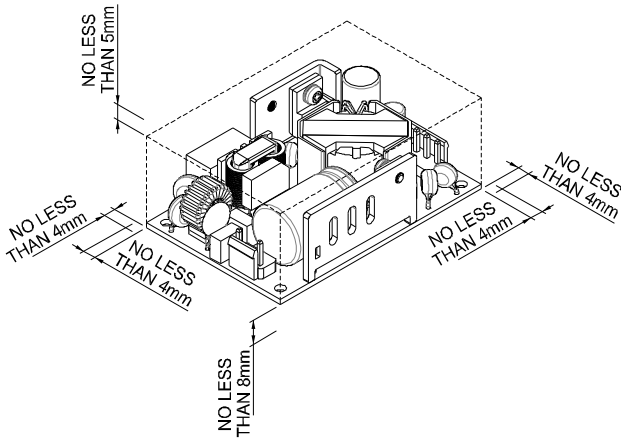


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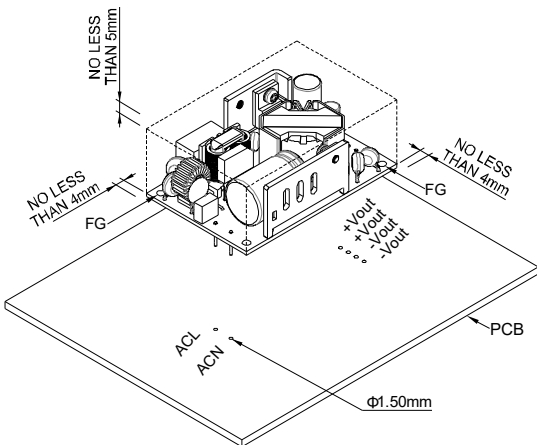
4.3.2 Space Reservation (Insulation Requirement)

For the CFM50SXXX, please reserve 4mm space from the surfaces and the sides of PCB, especially from the solder surface, 8mm space is necessary.

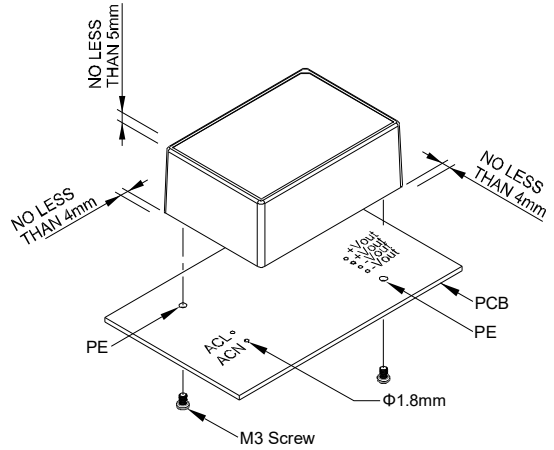


CFM50SXXX

The CFM50SXXX-P mounting holes are 1.5mm & CFM50SXXX-E mounting holes are 1.8mm. 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. Be especially careful to allow 5mm between the solder side of the PCB and the mounting surface. If the space is not enough, the specification of insulation and withstand will not be satisfied.

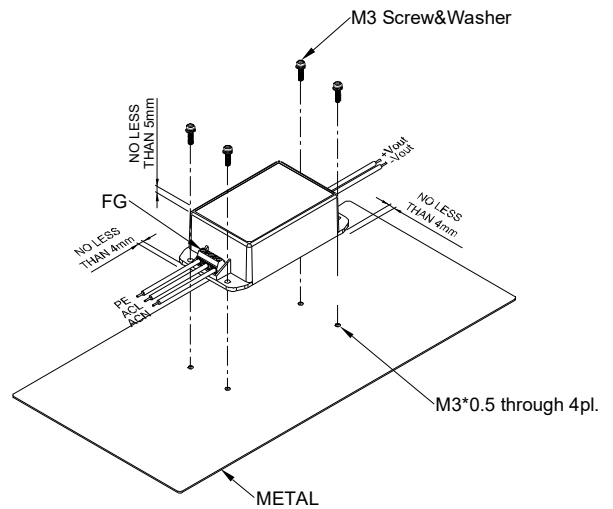


CFM50SXXX-P



CFM50SXXX-E

For the CFM50SXXX-S, please allow 4mm side clearance from the components and all side of the CASE. Allow 5mm clearance above the highest parts on the CASE. If the space is not enough, the specification of insulation and withstand will not be satisfied.



CFM50SXXX-S



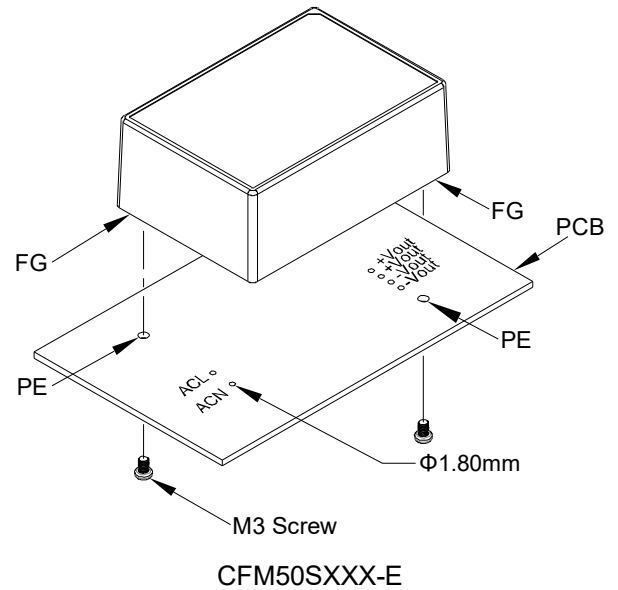
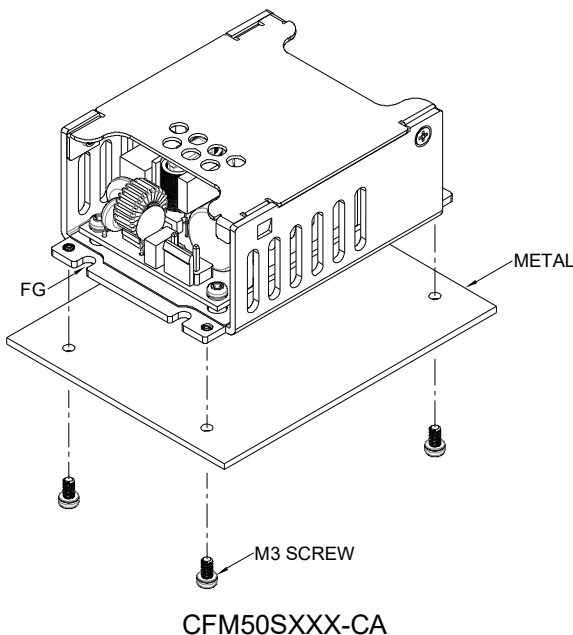
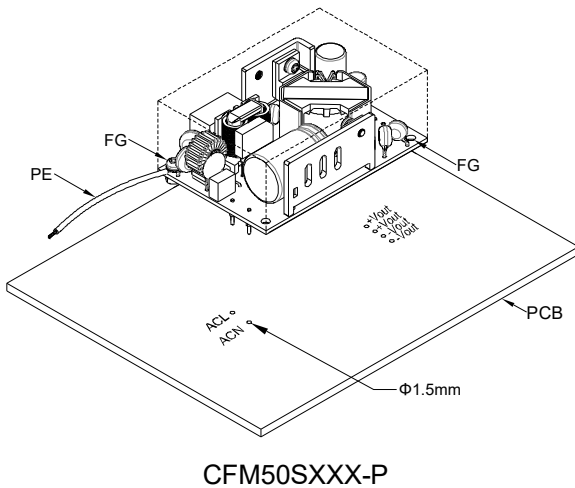
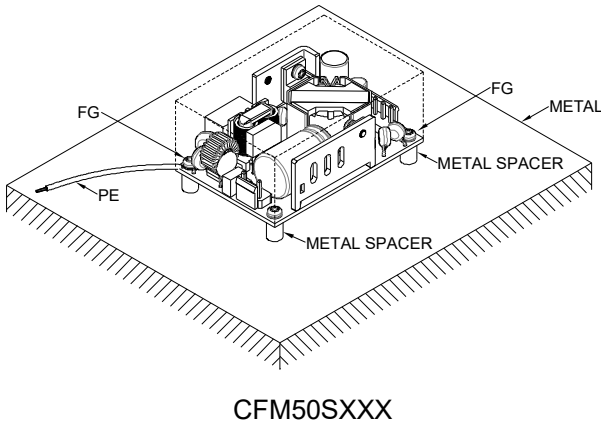
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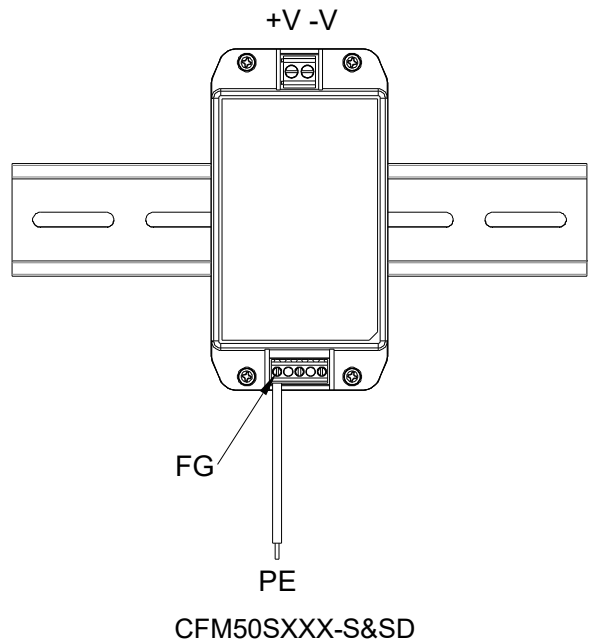
4.3.3 Class I Application (Connected FG to Earth)

For CFM50SXXX(-P/-CA), FG should be connected to the earth (ground) terminal of the apparatus. No need to connect FG to Earth if Class II application. Could leave FG floating.

CFM50SXXX-E have Class I function, please lock the screw in FG; If you don't need Class I function, you don't need to lock the screw in FG.



For CFM50SXXX-S(SD) FG should be connected to the earth (ground) terminal of the apparatus. No need to connect FG to Earth if Class II application. Could leave FG floating.



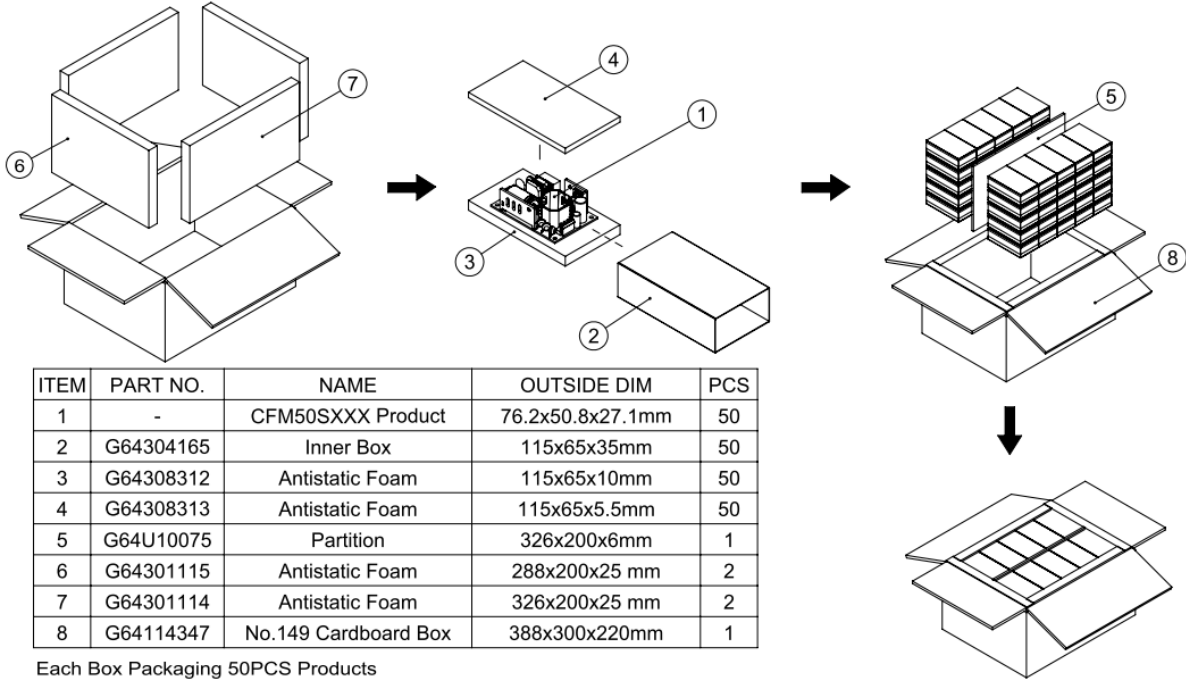


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5. Packing Information

The packing information for CFM50SXXX SERIES:

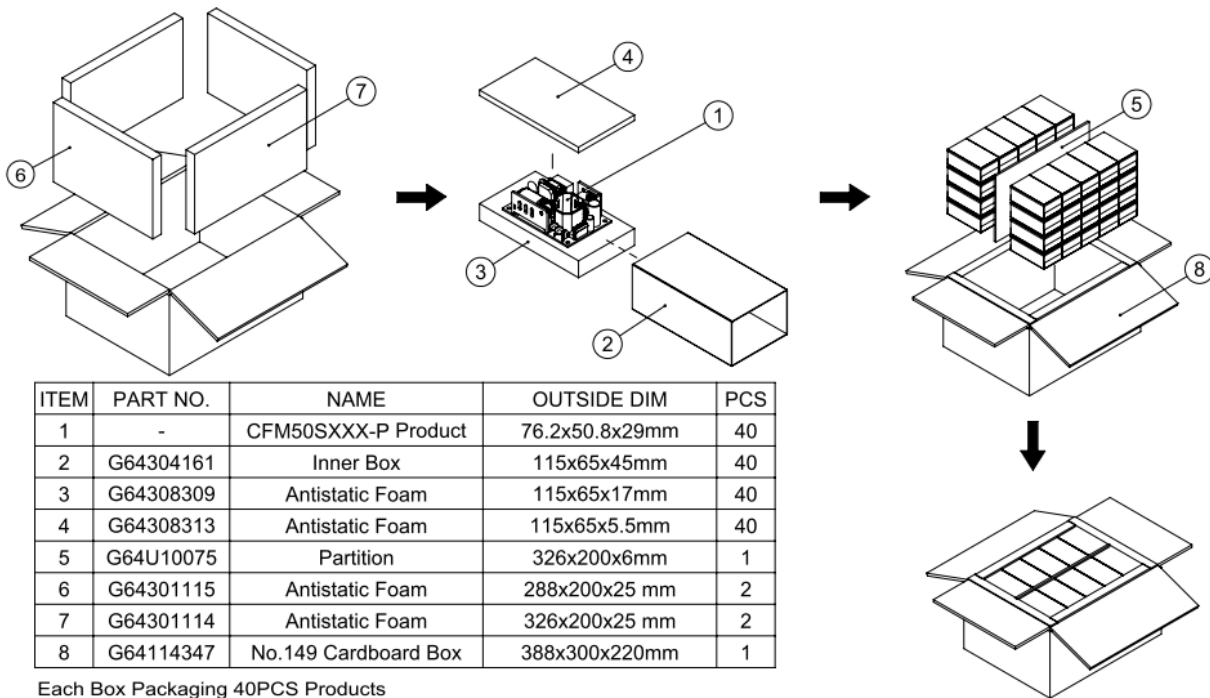


| ITEM | PART NO. | NAME | OUTSIDE DIM | PCS |
|------|-----------|----------------------|------------------|-----|
| 1 | - | CFM50SXXX Product | 76.2x50.8x27.1mm | 50 |
| 2 | G64304165 | Inner Box | 115x65x35mm | 50 |
| 3 | G64308312 | Antistatic Foam | 115x65x10mm | 50 |
| 4 | G64308313 | Antistatic Foam | 115x65x5.5mm | 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
Gross Weight Ref. 6.2Kg

CFM50SXXX 50pcs a box, including the total weight of package material about 6.2Kg

The packing information for CFM50SXXX-P SERIES:



| ITEM | PART NO. | NAME | OUTSIDE DIM | PCS |
|------|-----------|----------------------|----------------|-----|
| 1 | - | CFM50SXXX-P Product | 76.2x50.8x29mm | 40 |
| 2 | G64304161 | Inner Box | 115x65x45mm | 40 |
| 3 | G64308309 | Antistatic Foam | 115x65x17mm | 40 |
| 4 | G64308313 | Antistatic Foam | 115x65x5.5mm | 40 |
| 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 40PCS Products
Gross Weight Ref. 5.2Kg

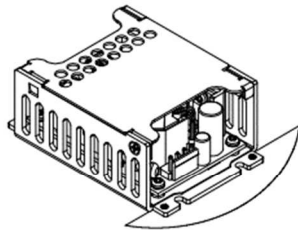
CFM50SXXX-P 40 pcs a box, including the total weight of package material about 5.2Kg



CFM50S Series

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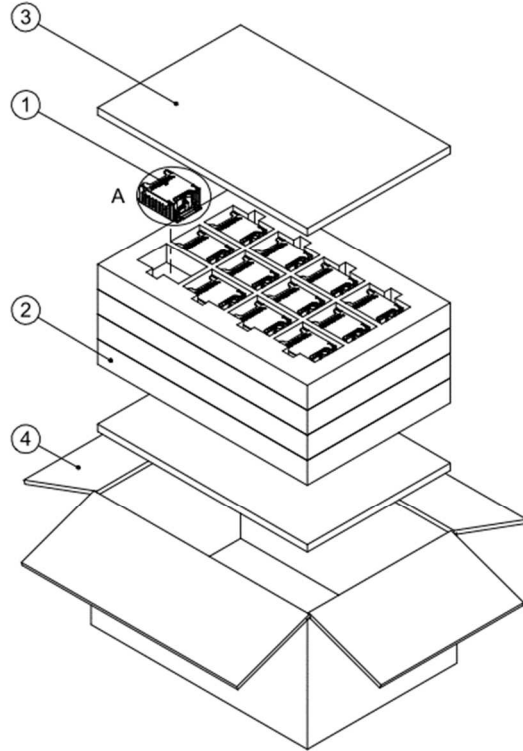
The packing information for CFM50SXXX-CA SERIES:



Detail Enlargement A

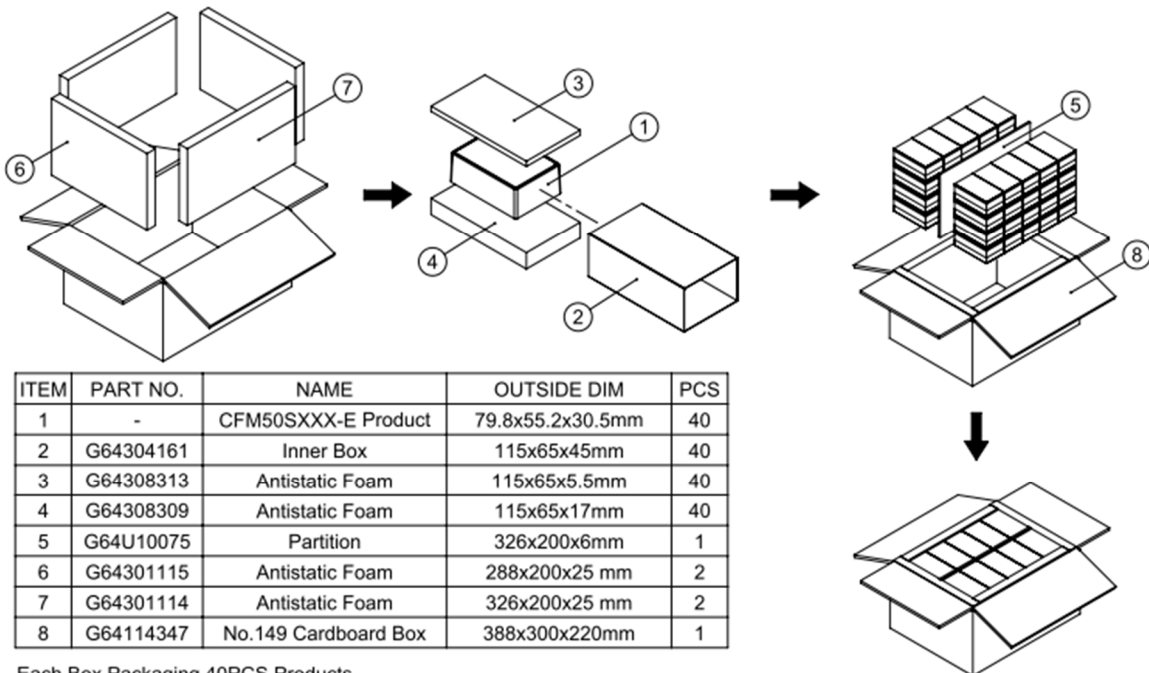
| ITEM | PART NO. | NAME | OUTSIDE DIM | PCS |
|------|-----------|----------------------|---------------|-----|
| 1 | - | CFM50SXXX-CA Product | 81.28x62x40mm | 48 |
| 2 | G64301210 | Antistatic Foam | 485x330x50mm | 4 |
| 3 | G64301208 | Antistatic Foam | 485x330x15mm | 2 |
| 4 | G64100099 | No.49 Cardboard Box | 500x345x260mm | 1 |

Each Box Packaging 48 PCS Products
Gross weight Ref. 10.0 Kg



CFM50SXXX-CA 48 pcs a box, including the total weight of package material about 10Kg

The packing information for CFM50SXXX-E SERIES:



| ITEM | PART NO. | NAME | OUTSIDE DIM | PCS |
|------|-----------|----------------------|------------------|-----|
| 1 | - | CFM50SXXX-E Product | 79.8x55.2x30.5mm | 40 |
| 2 | G64304161 | Inner Box | 115x65x45mm | 40 |
| 3 | G64308313 | Antistatic Foam | 115x65x5.5mm | 40 |
| 4 | G64308309 | Antistatic Foam | 115x65x17mm | 40 |
| 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 40PCS Products
Gross Weight Ref. 10.4Kg

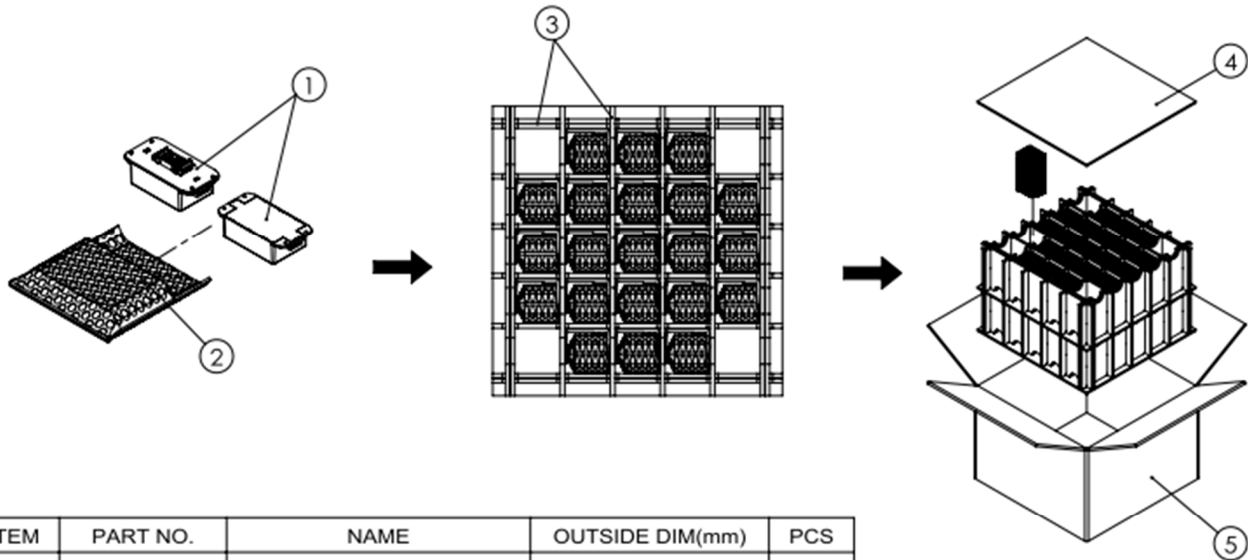
CFM50SXXX-E 40 pcs a box, including the total weight of package material about 10.4Kg



CFM50S Series

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The packing information for CFM50SXXX-S(D) SERIES:



| ITEM | PART NO. | NAME | OUTSIDE DIM(mm) | PCS |
|------|-----------|---|------------------------------------|-----|
| 1 | - | CFM50SXXX-S Product CFM50SXXX-SD Product | 106.6x55.2x30.5 106.6x55.2x45.3 | 42 |
| 2 | G64F00005 | Antistatic Bag | 165x(110+60) | 42 |
| 3 | G64U10045 | Partition | 440x142x7 | 32 |
| 4 | G64U13046 | Partition | 440x440x6 | 3 |
| 5 | G64114295 | No.116 Cardboard Box | 455x455x321 | 1 |

Each Box Packaging 42PCS Products
CFM50SXXX-S
Gross weight Ref. 11.5 Kg
CFM50SXXX-SD
Gross weight Ref. 15.5 Kg

CFM50SXXX-S 42 pcs a box, including the total weight of package material about 11.5Kg

CFM50SXXX-SD 42 pcs a box, including the total weight of package material about 15.5Kg

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