



# CFM130M SERIES

## 130 WATT MEDICAL

### AC-DC POWER SUPPLY WITH PFC

### Features

- Universal Input Range 80~264Vac
- High Efficiency up to 94%
- 2"x 3" Open Frame Compact Size
- Class I & Class II (NOTE8)
- No Load Input Power Consumption<150mW
- Peak Power Operation up to 150Watt for 5s
- Approval Safety IEC/EN/UL 60601-1 2 MOPP
- Operating Altitude 5000m
- 100W with Natural Convection
- 130W with Fan-Cooled
- Continuous Short Circuit Protection
- Active PFC Function



| MODEL NUMBER | OUTPUT VOLTAGE | OUTPUT CURRENT     |                  | RIPPLE & NOISE NOTE2 | VOLTAGE ACCURACY NOTE1 | LINE REGULATION NOTE3 | LOAD REGULATION NOTE4 | %EFF. (Typ.) NOTE5 |
|--------------|----------------|--------------------|------------------|----------------------|------------------------|-----------------------|-----------------------|--------------------|
|              |                | NATURAL CONVECTION | FAN COOLED NOTE7 |                      |                        |                       |                       |                    |
| CFM130M120   | 12 V           | 8.34 A             | 10.8 A           | 120 mV               | ±2%                    | ±0.5%                 | ±1%                   | 93%                |
| CFM130M180   | 18 V           | 5.56 A             | 7.2 A            | 180 mV               | ±2%                    | ±0.5%                 | ±1%                   | 93%                |
| CFM130M190   | 19 V           | 5.26 A             | 6.8 A            | 190 mV               | ±2%                    | ±0.5%                 | ±1%                   | 93%                |
| CFM130M240   | 24 V           | 4.2 A              | 5.4 A            | 240 mV               | ±2%                    | ±0.5%                 | ±1%                   | 93%                |
| CFM130M360   | 36 V           | 2.8 A              | 3.6 A            | 360 mV               | ±2%                    | ±0.5%                 | ±1%                   | 94%                |
| CFM130M480   | 48 V           | 2.1 A              | 2.7 A            | 480 mV               | ±2%                    | ±0.5%                 | ±1%                   | 94%                |

Note:

1. Voltage accuracy is set at full load.
2. Add a 0.1uF ceramic capacitor and a 10uF E.L. capacitor to output for ripple & noise measuring @20MHz BW.
3. Line regulation is measured from 100Vac to 240Vac with full load.
4. Load regulation is measured from 10% to 100% full load.
5. Typical efficiency at 230 VAC and 75% full load at 25°C.
6. Standard input and output connectors (CN1 and CN2) wafer with TAIWAN KING PIN TERMINAL PVHI series and mate with JSThousing VHR series or equivalent.
7. Requires 10CFM.
8. Conductive: Class I & Class II meets Class B Radiation: Class I meet Class B, Class II meet Class A.

### PART NUMBER

| Series | Number of Outputs | Nominal Output Voltage                                                     | Type                                           |
|--------|-------------------|----------------------------------------------------------------------------|------------------------------------------------|
| CFM130 | X                 | XXX                                                                        | -X (Option)                                    |
| CFM130 | M : MEDICAL       | 120 : 12V<br>180 : 18V<br>190 : 19V<br>240 : 24V<br>360 : 36V<br>480 : 48V | Blank : Wafer<br>B : Base Cooling<br>C : Cover |

Part Number Example:

**CFM130M120-B:** Open Frame, 130W, Medical 12Vdc Output, Base Cooling



# CFM130M Series

## TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25°C unless otherwise noted.)

### ABSOLUTE MAXIMUM RATINGS

| PARAMETER             | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units           |
|-----------------------|----------------------|--------|------|------|------|-----------------|
| Input Voltage         |                      | All    | 80   |      | 264  | V <sub>ac</sub> |
| Operating Temperature | See Derating Curve   | All    | -30  |      | 70   | °C              |
| Storage Temperature   |                      | All    | -40  |      | 85   | °C              |
| Operating Altitude    |                      | All    |      |      | 5000 | m               |

### INPUT CHARACTERISTICS

| PARAMETER                | NOTES and CONDITIONS                                   | Device | Min. | Typ. | Max. | Units           |
|--------------------------|--------------------------------------------------------|--------|------|------|------|-----------------|
| Operating Voltage Range  |                                                        | All    | 100  |      | 240  | V <sub>ac</sub> |
| Input Frequency Range    |                                                        | All    | 47   |      | 63   | Hz              |
| Maximum Input Current    | 100% Load, V <sub>in</sub> =100V <sub>ac</sub>         | All    |      |      | 1.8  | A               |
| Inrush Current           | V <sub>in</sub> =240V <sub>ac</sub> , Cold start @25°C | All    |      |      | 100  | A               |
| Leakage Current          |                                                        | All    |      |      | 100  | uA              |
| Under Voltage Protection |                                                        | All    | 55   | 62   | 70   | V <sub>ac</sub> |

### OUTPUT CHARACTERISTICS

| PARAMETER                      | NOTES and CONDITIONS                                                                                                                                                                                                            | Device     | Min.  | Typ. | Max.  | Units           |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------|------|-------|-----------------|
| Output Voltage Set Point       | V <sub>in</sub> =80V <sub>ac</sub> ~264V <sub>ac</sub> , I <sub>o</sub> =Full load, Ambient temperature=25°C                                                                                                                    | CFM130M120 | 11.76 | 12   | 12.24 | V <sub>dc</sub> |
|                                |                                                                                                                                                                                                                                 | CFM130M180 | 17.64 | 18   | 18.36 |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M190 | 18.62 | 19   | 19.38 |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M240 | 23.52 | 24   | 24.48 |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M360 | 35.28 | 36   | 36.72 |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M480 | 47.04 | 48   | 48.96 |                 |
| Operating Output Current Range | V <sub>in</sub> =80V <sub>ac</sub> ~264V <sub>ac</sub> , See Derating Curve                                                                                                                                                     | CFM130M120 |       |      | 10.8  | A               |
|                                |                                                                                                                                                                                                                                 | CFM130M180 |       |      | 7.2   |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M190 |       |      | 6.8   |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M240 |       |      | 5.4   |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M360 |       |      | 3.6   |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M480 |       |      | 2.7   |                 |
| Holdup Time                    | V <sub>in</sub> =115V <sub>ac</sub>                                                                                                                                                                                             | All        | 20    |      |       | ms              |
| Output Voltage Regulation      |                                                                                                                                                                                                                                 |            |       |      |       |                 |
| Load Regulation                | 10% Load to full load                                                                                                                                                                                                           | All        |       |      | ±1.0  | %               |
| Line Regulation                | V <sub>in</sub> =High line to low line                                                                                                                                                                                          | All        |       |      | ±0.5  | %               |
| Over Voltage Protection        | Auto recovery                                                                                                                                                                                                                   | CFM130M120 |       | 13.5 |       | V <sub>dc</sub> |
|                                |                                                                                                                                                                                                                                 | CFM130M180 |       | 20.5 |       |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M190 |       | 23   |       |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M240 |       | 30   |       |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M360 |       | 42   |       |                 |
|                                |                                                                                                                                                                                                                                 | CFM130M480 |       | 54   |       |                 |
| Peak Power                     | 1. V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub><br>2. Ambient temperature=25°C<br>3. Peak power should be less than 5seconds, with a maximum 10% duty cycle, peak power function by 115% load 5S and 75% load 45S | All        |       | 115  |       | %               |
| Over Current Protection        | Auto recovery                                                                                                                                                                                                                   | All        | 115   | 130  | 145   | %               |
| Short Circuit Protection       | Auto recovery                                                                                                                                                                                                                   | All        |       |      |       |                 |



## CFM130M Series

| PARAMETER               | NOTES and CONDITIONS                                                                                                                                        | Device     | Min. | Typ. | Max. | Units |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------|------|------|-------|
| Output Ripple and Noise | 1. Add a 0.1uF ceramic capacitor and a 10uF aluminum electrolytic capacitor to output<br>2. Oscilloscope is 20MHz band width<br>3. Ambient temperature=25°C | CFM130M120 |      |      | 120  | mV    |
|                         |                                                                                                                                                             | CFM130M180 |      |      | 180  |       |
|                         |                                                                                                                                                             | CFM130M190 |      |      | 190  |       |
|                         |                                                                                                                                                             | CFM130M240 |      |      | 240  |       |
|                         |                                                                                                                                                             | CFM130M360 |      |      | 360  |       |
|                         |                                                                                                                                                             | CFM130M480 |      |      | 480  |       |
| Load Capacitance        | 1. Input voltage is 115V <sub>ac</sub> and 230V <sub>ac</sub> .<br>2. Output is max. full load<br>3. Ambient temperature=25°C                               | CFM130M120 |      |      | 8400 | uF    |
|                         |                                                                                                                                                             | CFM130M180 |      |      | 5600 |       |
|                         |                                                                                                                                                             | CFM130M190 |      |      | 5200 |       |
|                         |                                                                                                                                                             | CFM130M240 |      |      | 4200 |       |
|                         |                                                                                                                                                             | CFM130M360 |      |      | 2720 |       |
|                         |                                                                                                                                                             | CFM130M480 |      |      | 2040 |       |
| Efficiency              | 1. Input voltage is 230V <sub>ac</sub><br>2. Output is 75% full load<br>3. Ambient temperature=25°C                                                         | CFM130M120 |      | 93   |      | %     |
|                         |                                                                                                                                                             | CFM130M180 |      | 93   |      |       |
|                         |                                                                                                                                                             | CFM130M190 |      | 93   |      |       |
|                         |                                                                                                                                                             | CFM130M240 |      | 93   |      |       |
|                         |                                                                                                                                                             | CFM130M360 |      | 94   |      |       |
|                         |                                                                                                                                                             | CFM130M480 |      | 94   |      |       |

### ISOLATION CHARACTERISTICS

| PARAMETER                | NOTES and CONDITIONS                    | Device | Min. | Typ. | Max. | Units           |
|--------------------------|-----------------------------------------|--------|------|------|------|-----------------|
| Input to Output          | 1 Minute (without dielectric breakdown) | All    |      |      | 4400 | V <sub>ac</sub> |
| Input to Earth (Ground)  | 1 Minute (without dielectric breakdown) | All    |      |      | 1800 | V <sub>ac</sub> |
| Output to Earth (Ground) | 1 Minute (without dielectric breakdown) | All    |      |      | 1800 | V <sub>ac</sub> |
| Isolation Resistance     | Input to output                         | All    | 100  |      |      | MΩ              |

### FEATURE CHARACTERISTICS

| PARAMETER           | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---------------------|----------------------|--------|------|------|------|-------|
| Switching Frequency |                      | All    |      | 105  |      | kHz   |

### GENERAL SPECIFICATIONS

| PARAMETER    | NOTES and CONDITIONS                                                                                                           | Device                            | Min.                                               | Typ.              | Max. | Units      |
|--------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------------|-------------------|------|------------|
| MTBF         | I <sub>o</sub> =100%; T <sub>a</sub> =25°C per MIL-HDBK-217F<br>I <sub>o</sub> =100%; T <sub>a</sub> =25°C Telcordia SR332     | All                               | 500<br>3160                                        |                   |      | k<br>hours |
| Humidity     | Non-condensing                                                                                                                 | All                               |                                                    |                   | 93   | % RH       |
| Shock        | Meets MIL-STD-810F Table 516.5, TABLE 516.5-I 10ms, each axis 3 times(±X ∙ ±Y ∙ ±Z axis)                                       | All                               |                                                    | 75                |      | g          |
| Vibration    | Meets MIL-STD-810F Table 514.5C-VIII, 15~2000Hz, X ∙ Y ∙ Z axis, 1 hr (each axis),. total 3 hrs.                               | All                               |                                                    | 4                 |      | g          |
| Weight       |                                                                                                                                | CFM130M<br>CFM130M-B<br>CFM130M-C |                                                    | 135<br>170<br>218 |      | grams      |
| Dimensions   | Open Frame (Wafer)                                                                                                             | All                               | 3.000x2.000x1.201 Inches<br>(76.20x50.80x30.50 mm) |                   |      |            |
|              | B (Base Cooling)                                                                                                               |                                   | 3.598x2.000x1.299 Inches<br>(91.40x50.80x33.00mm)  |                   |      |            |
|              | C (Cover)                                                                                                                      |                                   | 3.598x2.520x1.358 Inches<br>(91.40x64.00x34.50mm)  |                   |      |            |
| Safety       | Class I & Class II,<br>IEC 60601-1:2005/AMD2:2020, EN 60601-1:2006+A1+A12+A2,<br>ANSI/AAMI ES 60601-1:2005 & A1:2012 & A2:2021 |                                   |                                                    |                   |      | Ed 3.2     |
| EMC Emission | EN 55011, Class B, IEC 61000-3-2:2018, IEC 61000-3-3:2013+A1: 2017, FCC CFR 47 Part 18                                         |                                   |                                                    |                   |      |            |



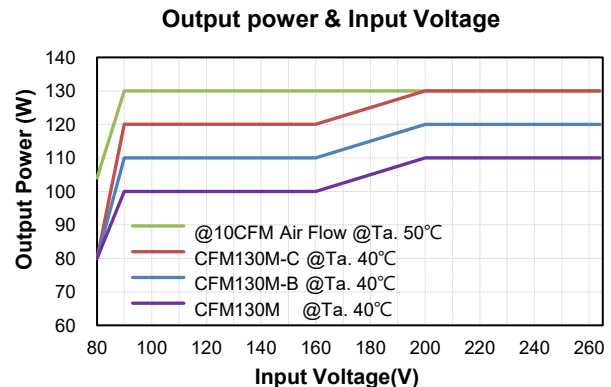
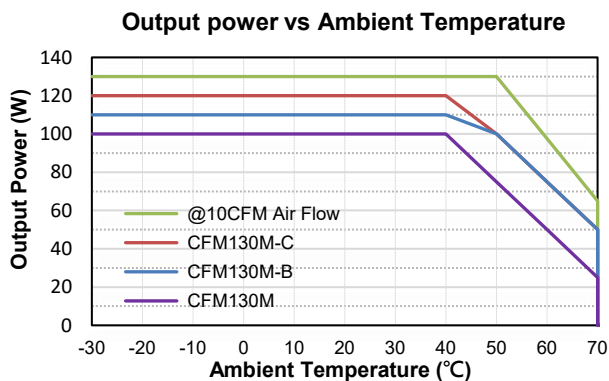
# CFM130M Series

## GENERAL SPECIFICATIONS

|                                                  |                                                                                                       |             |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------|
| Conducted Disturbance                            | EN 55011, FCC CFR 47 Part 18 (Class I & Class II meets Class B)                                       | Class B     |
| Radiated Disturbance                             | EN 55011, FCC CFR 47 Part 18 Class I (Class I Meet Class B; Class II Meet Class A)                    | Class B     |
| Harmonic Current Emissions                       | IEC 61000-3-2:2018                                                                                    | Class A     |
| Voltage Fluctuations & Flicker                   | EN 61000-3-3:2013+A1: 2017                                                                            | Criteria A  |
| <b>EMC Immunity</b>                              | EN 60601-1-2:2015+A1:2021, IEC 61000-4-2, 3, 4, 5, 6, 8, 11                                           | Ed 4.1      |
| Electrostatic Discharge (ESD)                    | IEC 61000-4-2:2008 Air Discharge: $\pm 15\text{kV}$ , Contact Discharge: $\pm 8\text{kV}$             | Criterion A |
| Radio-Frequency, Continuous Radiated Disturbance | IEC 61000-4-3:2020                                                                                    | Criterion A |
| Electrical Fast Transient (EFT)                  | IEC 61000-4-4:2012, $\pm 2\text{kV}$                                                                  | Criterion A |
| Surge                                            | IEC 61000-4-5:2014+A1:2017, L-N: $\pm 1\text{kV}$ , L-E (Ground): $\pm 1\text{kV}$ , $\pm 2\text{kV}$ | Criterion A |
| Conducted Disturbances, Induced by RF Fields     | IEC 61000-4-6:2013+C0R1:2015                                                                          | Criterion A |
| Power Frequency Magnetic Field                   | IEC 61000-4-8:2009                                                                                    | Criterion A |
| Voltage Dips                                     | IEC 61000-4-11:2020, Dip: 30% Reduction, Dip >95% Reduction                                           | Criterion A |
| Voltage Interruptions                            | IEC 61000-4-11:2020, >95% reduction                                                                   | Criterion B |
| Application Note Link                            | <a href="#">CFM130M Series App Notes</a>                                                              |             |

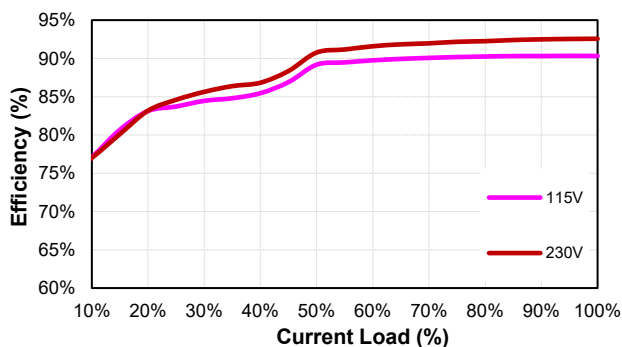
## CHARACTERISTIC CURVE

### Power Derating Curve

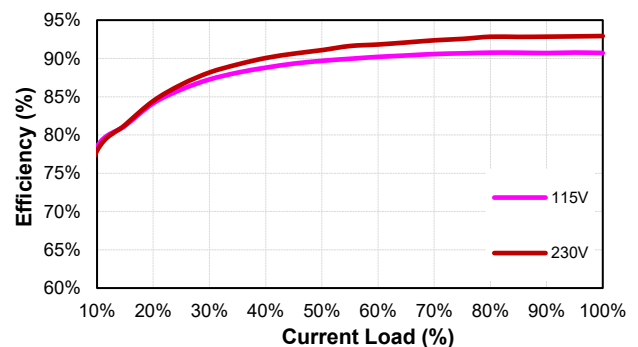


### Performance Data

CFM130M120 (Eff Vs Io)



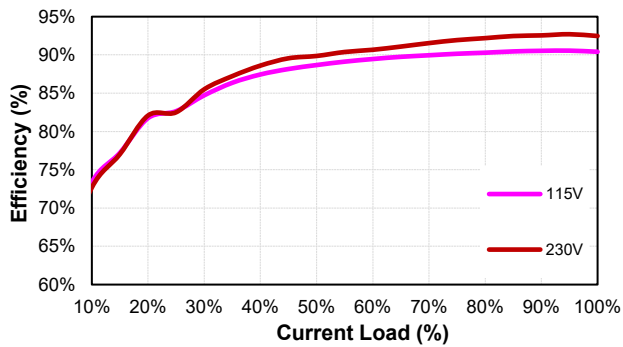
CFM130M180 (Eff Vs Io)



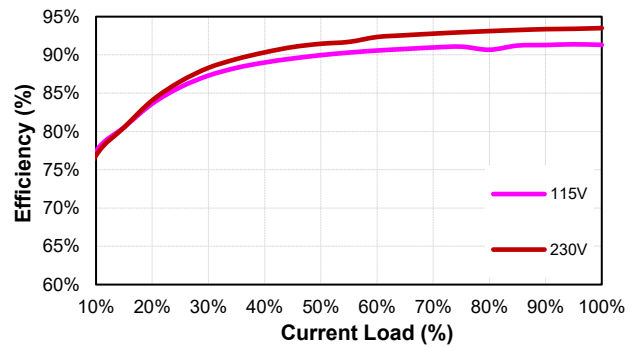


# CFM130M Series

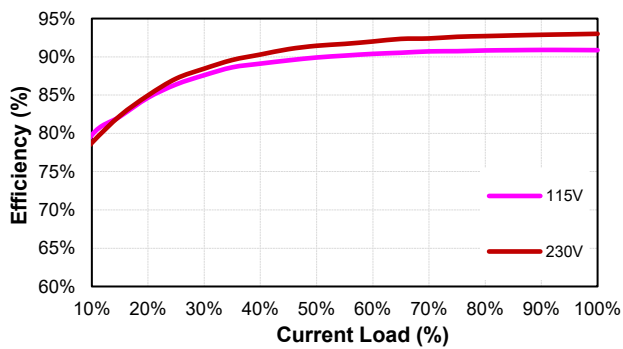
CFM130M190 (Eff Vs Io)



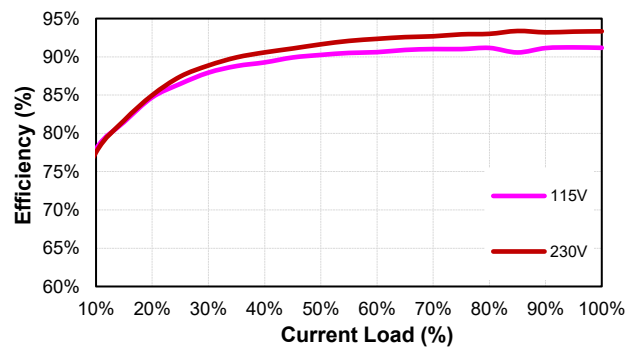
CFM130M240 (Eff Vs Io)



CFM130M360 (Eff Vs Io)



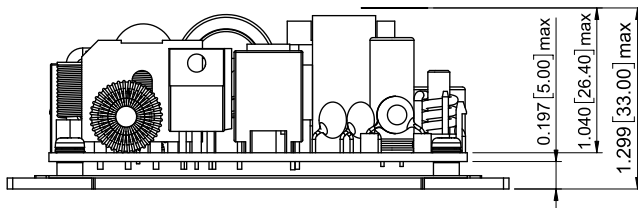
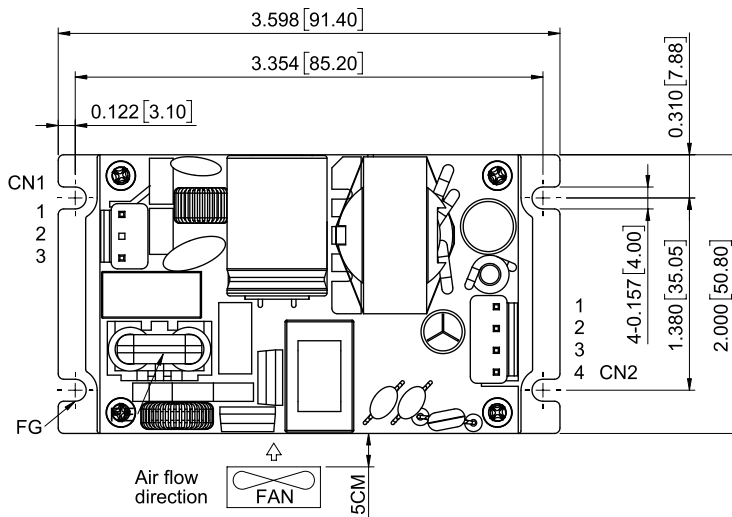
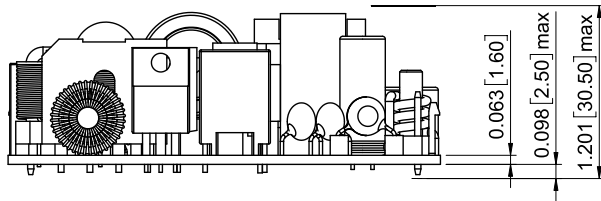
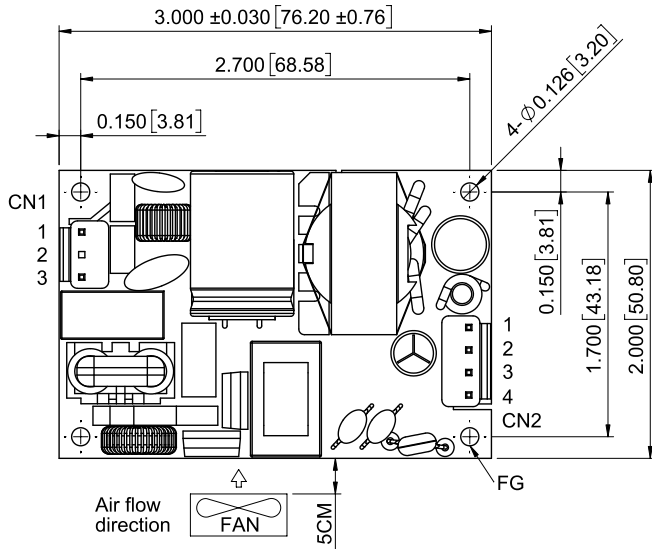
CFM130M480 (Eff Vs Io)





# CFM130M Series

## MECHANICAL SPECIFICATION



### CFM130M

All Dimensions in Inches[mm]

Tolerance Inches: x.xxx=±0.020

Millimeters: x.xx=±0.50

AC Input Connector(CN1):TKP PVHI-03N2 or equivalent

| Pin | Function | Mating Housing           | Terminal                       |
|-----|----------|--------------------------|--------------------------------|
| 1   | ACL      | JST VHR-3N or equivalent | JST SVH-21T-P1.1 or equivalent |
| 2   | -        |                          |                                |
| 3   | ACN      |                          |                                |

DC Output Connector(CN2):TKP PVHI-04 or equivalent

| Pin | Function | Mating Housing           | Terminal                       |
|-----|----------|--------------------------|--------------------------------|
| 1   | +Vout    | JST VHR-4N or equivalent | JST SVH-21T-P1.1 or equivalent |
| 2   | +Vout    |                          |                                |
| 3   | -Vout    |                          |                                |
| 4   | -Vout    |                          |                                |

### CFM130M-B

All Dimensions in Inches[mm]

Tolerance Inches: x.xxx=±0.020

Millimeters: x.xx=±0.50

AC Input Connector(CN1):TKP PVHI-03N2 or equivalent

| Pin | Function | Mating Housing           | Terminal                       |
|-----|----------|--------------------------|--------------------------------|
| 1   | ACL      | JST VHR-3N or equivalent | JST SVH-21T-P1.1 or equivalent |
| 2   | -        |                          |                                |
| 3   | ACN      |                          |                                |

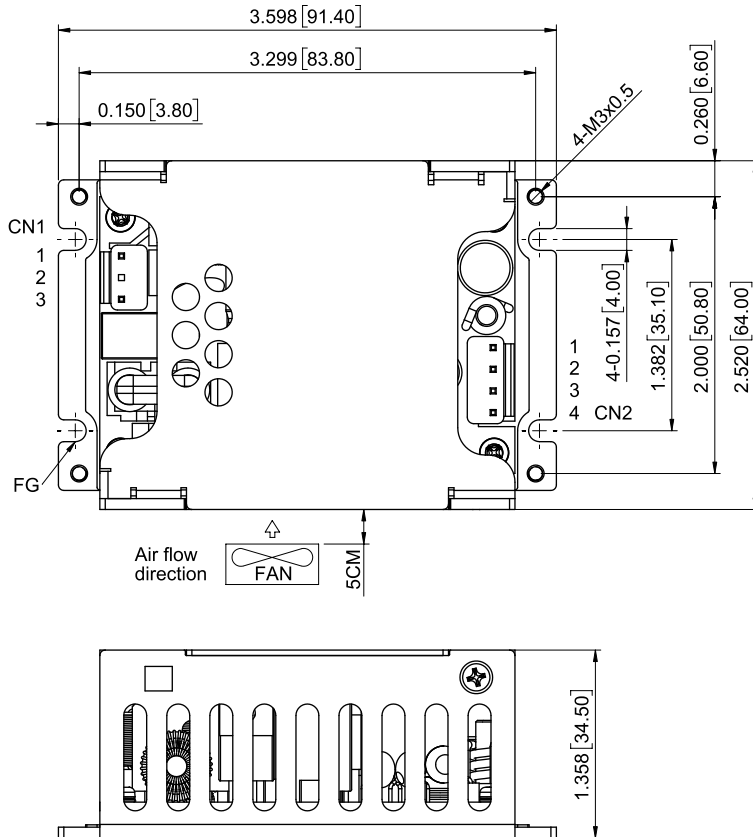
DC Output Connector(CN2):TKP PVHI-04 or equivalent

| Pin | Function | Mating Housing           | Terminal                       |
|-----|----------|--------------------------|--------------------------------|
| 1   | +Vout    | JST VHR-4N or equivalent | JST SVH-21T-P1.1 or equivalent |
| 2   | +Vout    |                          |                                |
| 3   | -Vout    |                          |                                |
| 4   | -Vout    |                          |                                |



# CFM130M Series

## MECHANICAL SPECIFICATION



### CFM130M-C

All Dimensions in Inches[mm]

Tolerance Inches: x .xxx=±0.020

Millimeters: x.xx=±0.50

AC Input Connector(CN1):TKP PVHI-03N2 or equivalent

| Pin | Function | Mating Housing              | Terminal                          |
|-----|----------|-----------------------------|-----------------------------------|
| 1   | ACL      | JST VHR-3N<br>or equivalent | JST SVH-21T-P1.1<br>or equivalent |
| 2   | -        |                             |                                   |
| 3   | ACN      |                             |                                   |

DC Output Connector(CN2):TKP PVHI-04 or equivalent

| Pin | Function | Mating Housing              | Terminal                          |
|-----|----------|-----------------------------|-----------------------------------|
| 1   | +Vout    | JST VHR-4N<br>or equivalent | JST SVH-21T-P1.1<br>or equivalent |
| 2   | +Vout    |                             |                                   |
| 3   | -Vout    |                             |                                   |
| 4   | -Vout    |                             |                                   |

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