

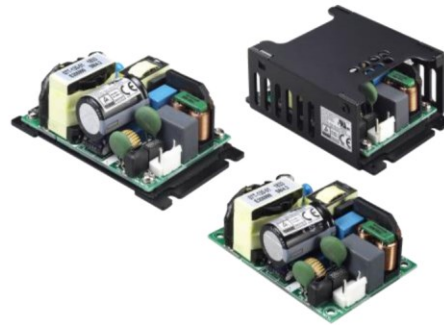


E-Star Power Development Co., Ltd. (E-STAR)  
 1F., No.40, Juren Ln., Sec. 2, Sanmin Rd., Banciao Dist., New Taipei City  
 22069, Taiwan (R.O.C.)  
 Phone : 886-2-2957 5580 Fax : 886-2-2957 7473

## 130W Open Frame type Medical power supply > CFM130M

### Features

- Universal Input Range 80~264Vac
- High Efficiency up to 94%
- 2"x 3" Open Frame Compact Size
- Class I & Class II (NOTE8)
- 100W with Natural Convection
- 130W with Fan-Cooled
- No Load Input Power Consumption<150mW
- Approved Safety IEC/EN/UL 60601-1 2 MOPP
- Meets IEC/EN60335-1
- Operating Altitude 5000m
- 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 JST housing 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 180 : 18V 190 : 19V 240 : 24V 360 : 36V 480 : 48V	Blank : Wafer B : Base Cooling C : Cover

Part Number Example:

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



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### 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> =100Vac	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

#### 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		
Over Current Protection	Auto recovery	All	115	130	145	%
Short Circuit Protection	Auto recovery	All				



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**130W Open Frame type Medical power supply > CFM130M**

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 2. Oscilloscope is 20MHz Band Width 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> . 2. Output is max. Full Load 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> 2. Output is 75% Full Load 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	All	400			k 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		135		grams
		CFM130M-B		170		
		CFM130M-C		218		
Dimensions	Open Frame (Wafer)	All	3.000x2.000x1.201 Inches (76.20x50.80x30.50 mm)			
	B (Base Cooling)		3.598x2.000x1.299 Inches (91.40x50.80x33.00mm)			
	C (Cover)		3.598x2.520x1.358 Inches (91.40x64.00x34.50mm)			
Safety	Class I & Class II, IEC 60601-1:2005 (Third Edition) + CORR. 1(2006) + CORR. 2(2007) + AM1(2012) EN 60601-1:2006;A11+A1+A12 ANSI/AAMI ES60601-1 (2005)/(R)2012 + A1:2012, C1:2009/(R)2012 + A2:2010/(R)2012) CAN/CSA-C22.2 No. 60601-1:14					Ed 3.1
EMC Emission	EN55011, Class B, IEC61000-3-2:2014, IEC61000-3-3:2013, FCC CFR 47 Part 18					



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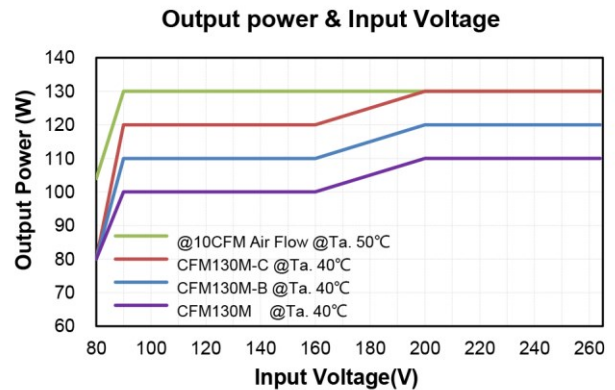
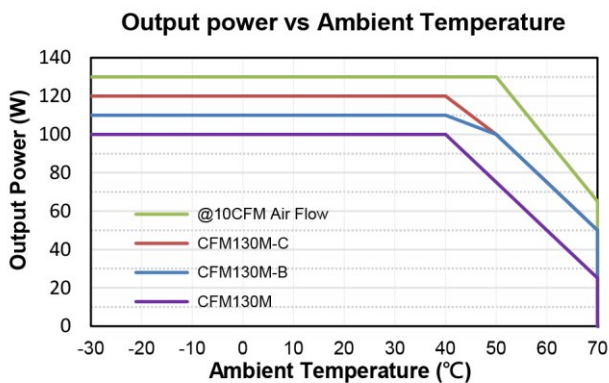
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### GENERAL SPECIFICATIONS

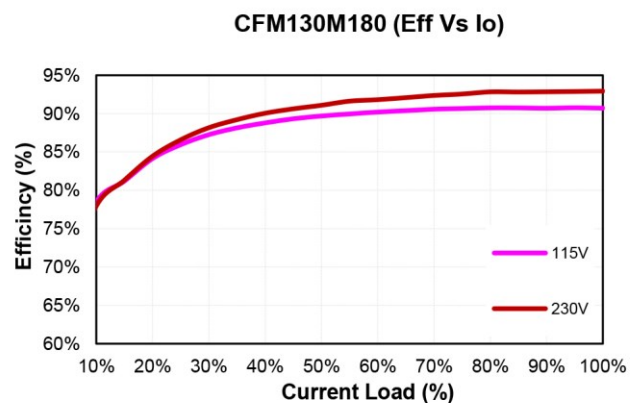
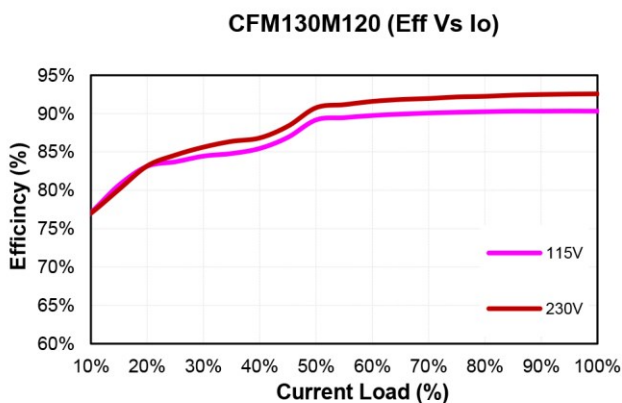
Conducted Disturbance	EN55011, FCC CFR 47 Part 18 (Class I & Class II meets Class B)	Class B
Radiated Disturbance	EN55011, FCC CFR 47 Part 18 Class I (Class I Meet Class B; Class II Meet Class A)	Class B
Harmonic Current Emissions	IEC 61000-3-2:2014	Class A
Voltage Fluctuations & Flicker	EN 61000-3-3:2013	Criteria A
<b>EMC Immunity</b>	EN60601-1-2:2015, IEC61000-4-2, 3, 4, 5, 6, 8, 11	Ed 4.0
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 61000-4-3:2006+A1:2007+A2:2010	Criterion A
Electrical Fast Transient (EFT)	IEC61000-4-4:2012, $\pm 2\text{kV}$	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+COR1:2015	Criterion A
Power Frequency Magnetic Field	IEC 61000-4-8:2009	Criterion A
Voltage Dips	IEC 61000-4-11:2004, Dip: 30% Reduction, Dip >95% Reduction	Criterion A
Voltage Interruptions	IEC 61000-4-11:2004+A1:2017, >95% reduction	Criterion B

### CHARACTERISTIC CURVE

#### Power Derating Curve



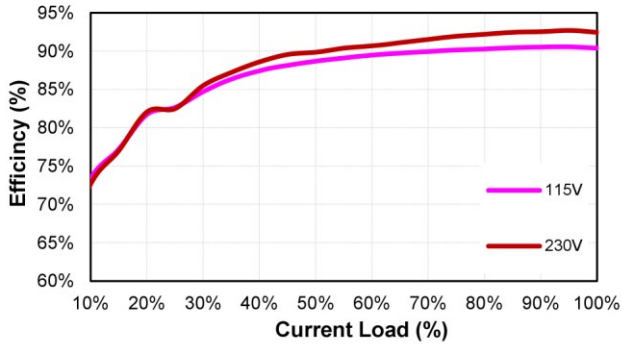
#### Performance Data



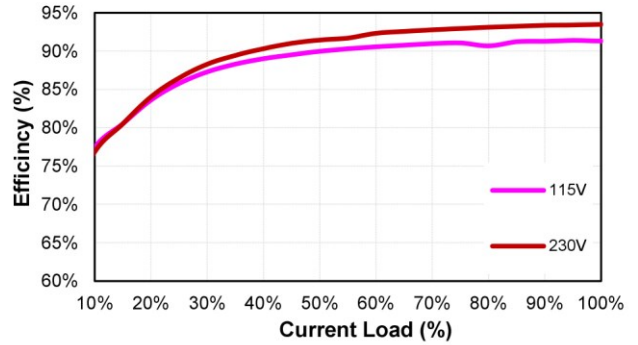


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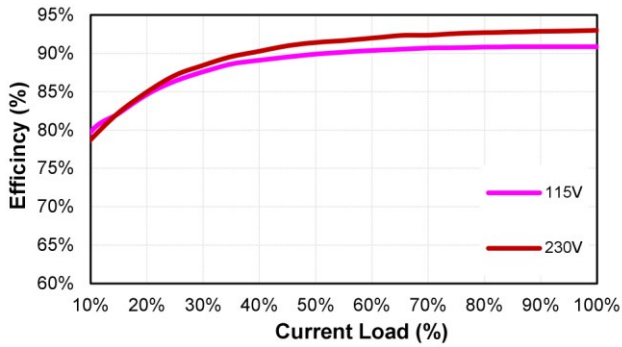
CFM130M190 (Eff Vs Io)



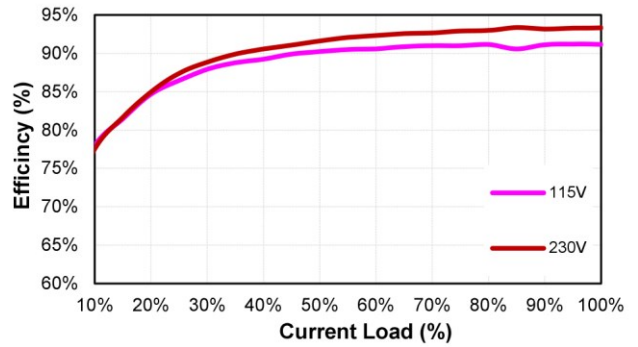
CFM130M240 (Eff Vs Io)



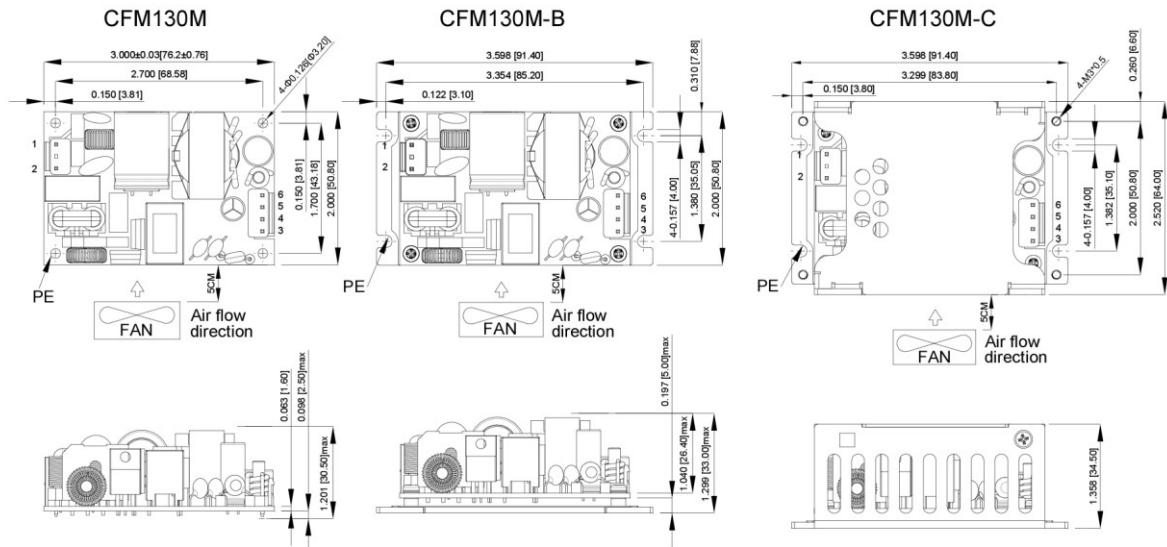
CFM130M360 (Eff Vs Io)



CFM130M480 (Eff Vs Io)



**MECHANICAL SPECIFICATION**



PIN CONNECTION	
Pin	Function
1	ACL
2	ACN
3	-Vout
4	-Vout
5	+Vout
6	+Vout

All Dimensions In Inches[mm]  
 Tolerance Inches:x.xxx= ± 0.02  
 Millimeters: x.xx = ± 0.5