



# CFM500S SERIES 500 WATT AC-DC POWER SUPPLY WITH PFC

## Features

- Universal Input Range 80~264V<sub>ac</sub>
- High Efficiency up to 94.5%
- 3"x 5" Compact Size
- High Power Density Up to 20.96W/Inch<sup>3</sup>
- 390W Natural, 470 ~ 500W Conduction Convection
- No Load Power Consumption<0.5W
- Over Temperature Protection
- PS On/Off Remote Control
- Power Good & Power Fail Signal
- +5V Stand-by, 12V Fan Output
- Low Inrush Current
- Active PFC Meets EN61000-3-2
- Meets EN55032 Class B
- Meets IEC/EN60335-1
- Class I



MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT CURRENT			VOLTAGE ACCURACY	RIPPLE & NOISE	VOLTAGE ADJ. RANGE	LINE REGULATION	LOAD REGULATION	%EFF. (Typ.)
		NOTE1								
		With Fan	Without Fan							
Cover	Open									
					NOTE2	NOTE3	NOTE4	NOTE5		
CFM500S120	12 V	41.67A	27.5A	25A	±1%	120mV	11.4~12.6 V	±0.5%	±1%	92.5%
CFM500S180	18 V	27.78A	18.33A	16.67A	±1%	150mV	17.1~18.9 V	±0.5%	±1%	93.5%
CFM500S240	24 V	20.83A	17.08A	15.83A	±1%	150mV	22.8~25.2 V	±0.5%	±1%	94.5%
CFM500S360	36 V	13.89A	11.39A	10.56A	±1%	200mV	34.2~37.8 V	±0.5%	±1%	94.5%
CFM500S480	48 V	10.42A	8.54A	7.92A	±1%	250mV	45.6~50.4 V	±0.5%	±1%	94.5%
<b>Stand-by Output Voltage</b>										
All	+5V	1A			±3%	1%	---	±1%	±5%	---
<b>Fan Output Voltage</b>										
All	+12V	0.5A (NOTE 6)			---	---	---	---	---	---

Note:

1. Forced Air Convection with 21CFM Fan.
2. Voltage Accuracy is Set at Full Load and 25°C Ta.
3. Add a 0.1uF Ceramic Capacitor and a 10uF E.L. Capacitor to Output for Ripple & Noise Measuring @20MHz B.W.
4. Line Regulation is Measured from High Line to Low Line with Rated Load.
5. Load Regulation is Measured from Full Load to 10% Rated Load.
6. Fan Output Can Only Operate Normal When the Stand-by Output is Above 0.5A.

## PART NUMBER

Series	Number of Outputs	Nominal Output Voltage	Type
CFM500	X	XXX	X (Option)
CFM500	S: Single	120: 12V 180: 18V 240: 24V 360: 36V 480: 48V	None: With Baseplate C: With Cover

Part Number Example:

- CFM500S120:** With Baseplate, 500W, 12Vdc Output
- CFM500S120C:** With Cover, 500W, 12Vdc Output



# CFM500S 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	Safety approvals only to the AC input	All	80		264	V <sub>ac</sub> V <sub>dc</sub>
Operating Case Temperature	See derating curve	All	-40		85	°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			6	A
Power Factor		All		0.97		
Leakage Current		All			0.1	mA
Inrush Current	V <sub>in</sub> =240V <sub>ac</sub> , Cold start at 25°C.	All		8.5		A

### OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Set Point	V <sub>in</sub> =Nominal V <sub>in</sub> , I <sub>o</sub> =I <sub>o</sub> max., T <sub>c</sub> =25°C.	CFM500S120	11.88	12	12.12	V <sub>dc</sub>
		CFM500S180	17.82	18	18.18	
		CFM500S240	23.76	24	24.24	
		CFM500S360	35.64	36	36.36	
		CFM500S480	47.52	48	48.48	
Operating Output Current Range		CFM500S120			41.67	A
		CFM500S180			27.78	
		CFM500S240			20.83	
		CFM500S360			13.89	
		CFM500S480			10.42	
Holdup Time	V <sub>in</sub> =115V <sub>ac</sub>	All		16		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	Latch off (AC recycle to reset)	CFM500S120			16	V <sub>dc</sub>
		CFM500S180			30	
		CFM500S240			35	
		CFM500S360			50	
		CFM500S480			63	
Over Current Protection	Auto recovery	All	120		190	%
Short Circuit Protection	Auto recovery	All				
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	CFM500S120			120	mV
		CFM500S180			150	
		CFM500S240			150	
		CFM500S360			200	
		CFM500S480			250	



# CFM500S Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Load Capacitance	1. Ambient temperature=25°C 2. Input Voltage is 115V <sub>ac</sub> and 230V <sub>ac</sub> 3. Output is max. load	CFM500S120			42900	uF
		CFM500S180			28600	
		CFM500S240			20800	
		CFM500S360			14000	
		CFM500S480			10800	
Efficiency	Output is rated load Ambient temperature=25°C @ Input voltage is 230V <sub>ac</sub>	CFM500S120		92.5		%
		CFM500S180		93.5		
		CFM500S240		94.5		
		CFM500S360		94.5		
		CFM500S480		94.5		
PS-On Signal	Power on	All	0		2	Vdc
	Power off (PS-ON and GND open)			4		
	Power on (PS-ON and GND short)				10	mA
	Power-off (PS-ON and GND open)				0	
Power Good (PG)	1. Input voltage is 90V <sub>ac</sub> ~264V <sub>ac</sub> 2. Output is max. load 3. The TTL goes high after power set up	All	100		500	ms
Power Fail (PF)	1. Input voltage is 90V <sub>ac</sub> ~264V <sub>ac</sub> 2. Output is max. load 3. The TTL goes low before Vo below 90% rated value	All	1	10		ms

## ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input to Output	1 minute	All			4000	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	Pout=max. rated power	All		65		kHz
Output Voltage adjustment		All	-5		+5	%

## 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		200		k hours
Humidity	Nom-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5, Table 516.5-I 10ms, each axis 3 times(±X、±Y、±Z axis)	All		75		g
Vibration	Meet MIL-STD-810F Table 514.5C-VIII, 15~2000Hz, X、Y、Z axis, 1 hour (each axis), Total 3 hrs.	All		4		g
Weight	Baseplate versions	All		515		g
	Covered versions			635		
Dimensions	With baseplate	All	5.000x3.000x1.540 Inches (127.00x76.20x39.10mm)			
	C (with cover)	All	5.354x3.425x1.673 Inches (136.00x87.00x42.50mm)			
Safety	Class I, IEC/EN/UL62368-1					
EMC Emission	EN55032:2015+AC:2016, EN61204-3:2000, EN61000-6-3:2007+A1:2011+AC:2012, EN61000-6-4:2007+A1:2011, 47 CFR FCC Part 15 Subpart B (Class B)				Class B	
Conducted Disturbance	EN55032, 47 CFR FCC Part 15 Subpart B (Class B)				Class B	
Radiated Disturbance	EN55032, 47 CFR FCC Part 15 Subpart B (Class B)				Class B	
Harmonic Current Emissions	EN61000-3-2:2014				Class A, C, D	
Voltage Fluctuations & Flicker	EN61000-3-3:2013					
EMC Immunity	EN55035:2017, EN61204-3:2000, EN61000-6-1:2019+CRGD:2019, EN61000-6-2:2019					



# CFM500S Series

## GENERAL SPECIFICATIONS

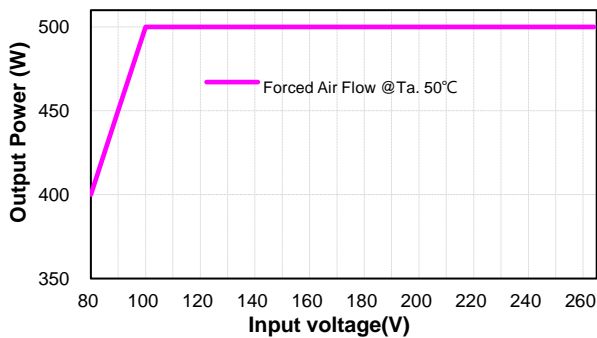
Electrostatic Discharge (ESD)	IEC61000-4-2:2008, Air Discharge: $\pm 8\text{kV}$ , Contact Discharge: $\pm 4\text{kV}$	Criterion A
Radio-Frequency, Continuous Radiated Disturbance	IEC61000-4-3:2006+A1:2007+A2:2010	Criterion A
Electrical Fast Transient (EFT)	IEC61000-4-4:2012, $\pm 1\text{kV}$ , $\pm 2\text{kV}$	Criterion A
Surge	IEC61000-4-5:2014+A1:2017, L-N: $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$ , L-E(Ground): $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$ , $\pm 2\text{kV}$	Criterion A
Conducted Disturbances, Induced by RF Fields	IEC61000-4-6:2013+COR1:2015	Criterion A
Power Frequency Magnetic Field	IEC61000-4-8:2009	Criterion A
Voltage Dips	IEC61000-4-11:2004+A1:2017, Dip: 30% Reduction, Dip >95% Reduction	Criterion A
Voltage Interruptions	IEC61000-4-11:2017+A1:2017, >95% Reduction	Criterion B
Application Note Link	<a href="#">CFM500S Series App Notes</a>	

## CHARACTERISTIC CURVE

### Power Derating Curve

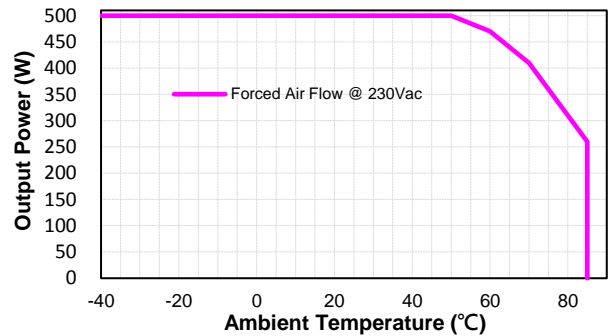
#### Forced Air Flow

Output power & Input voltage



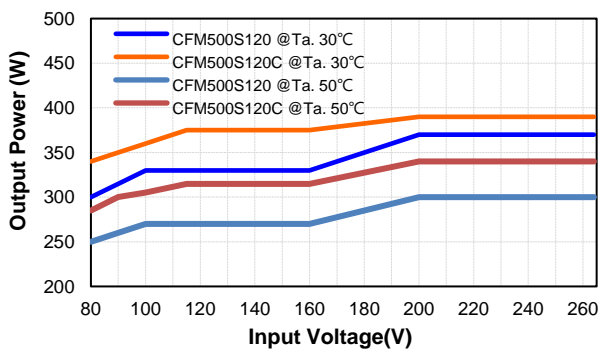
#### Forced Air Flow

Output power vs Ambient Temperature



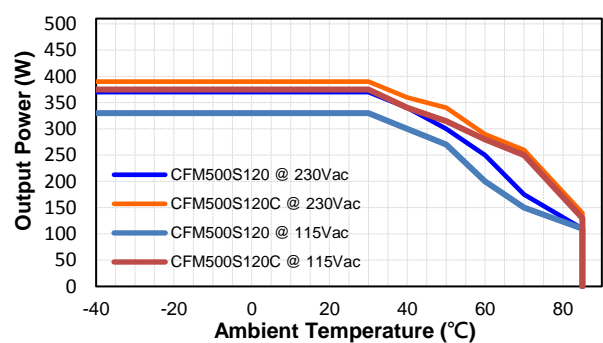
#### Natural Convection

Output power & Input Voltage



#### Natural Convection

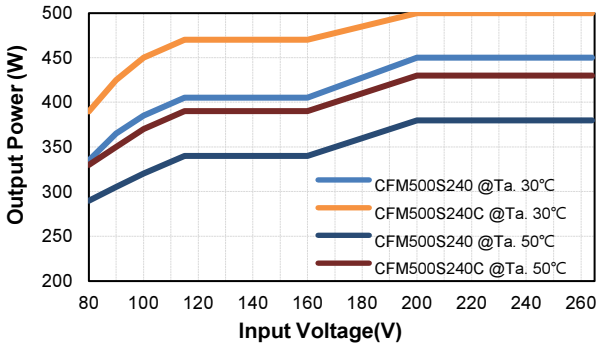
Output power vs Ambient Temperature





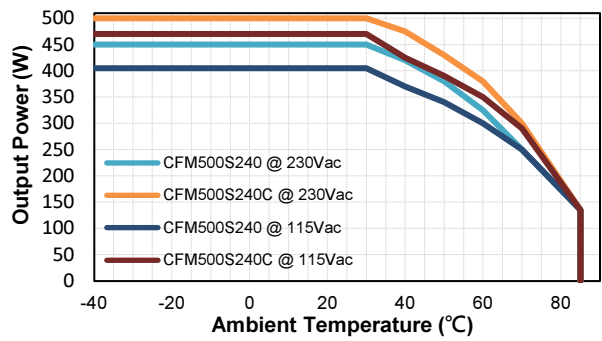
# CFM500S Series

Output power & Input Voltage



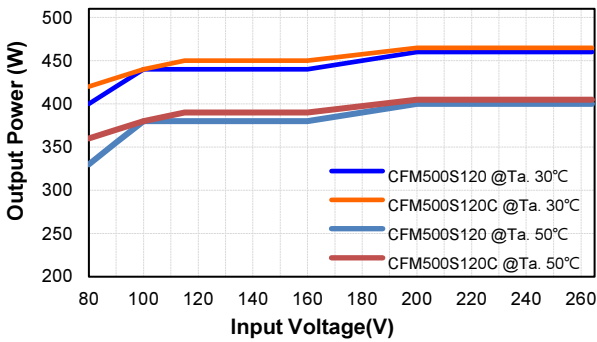
Conduction Convection with External Baseplate (48x24.8x0.12cm)

Output power vs Ambient Temperature

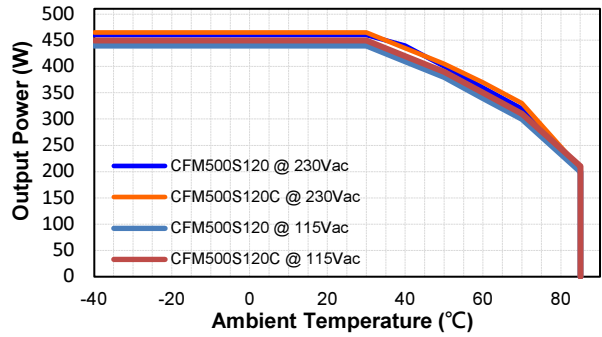


Conduction Convection with External Baseplate (48x24.8x0.12cm)

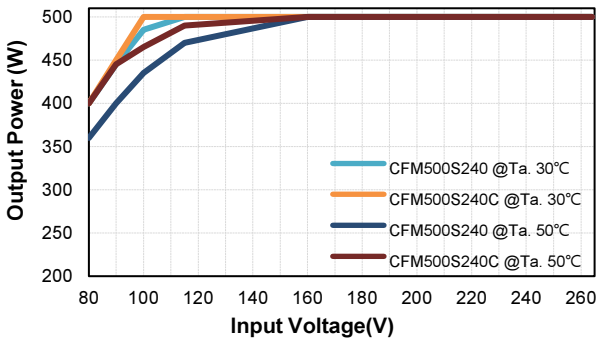
Output power & Input Voltage



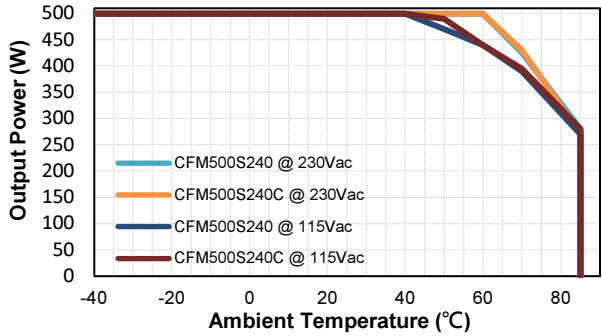
Output power vs Ambient Temperature



Output power & Input Voltage

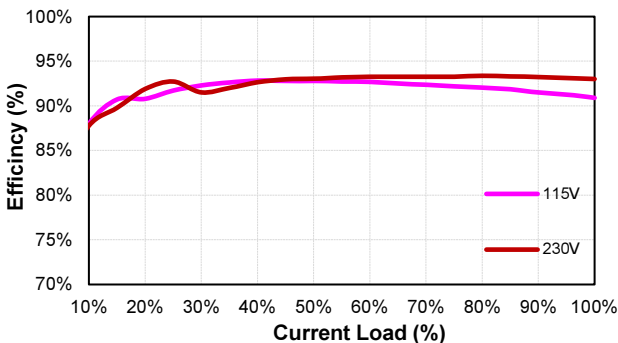


Output power vs Ambient Temperature

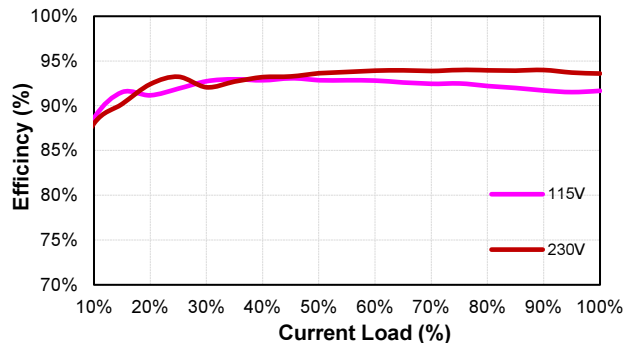


## Performance Data

CFM500S120 (Eff Vs Io)



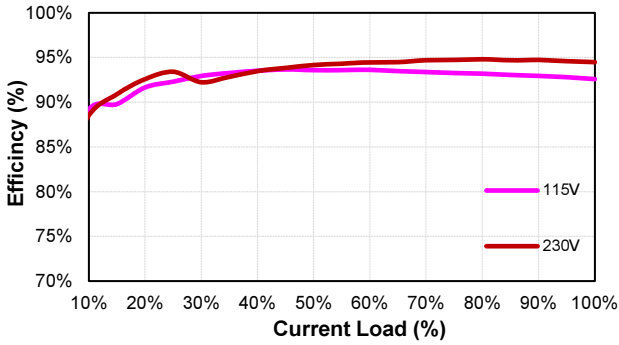
CFM500S180 (Eff Vs Io)



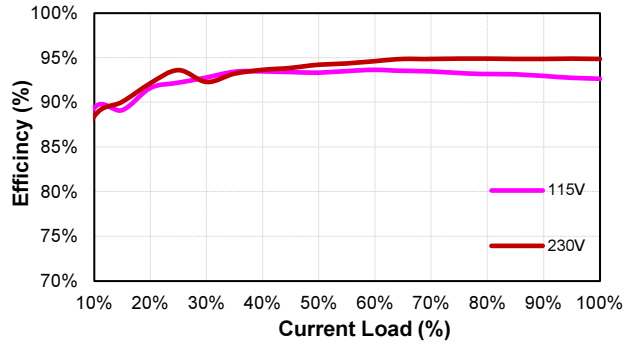


# CFM500S Series

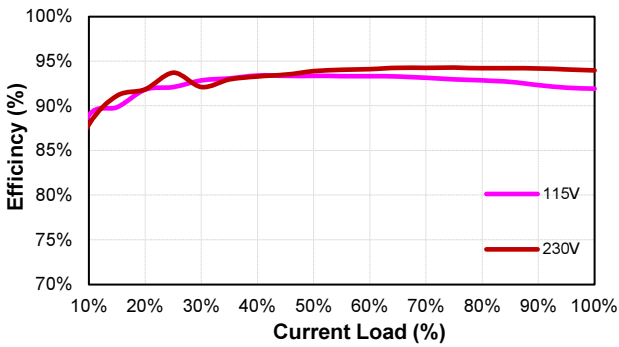
CFM500S240 (Eff Vs Io)



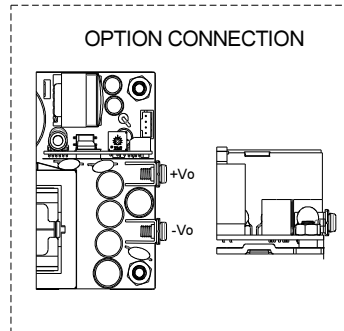
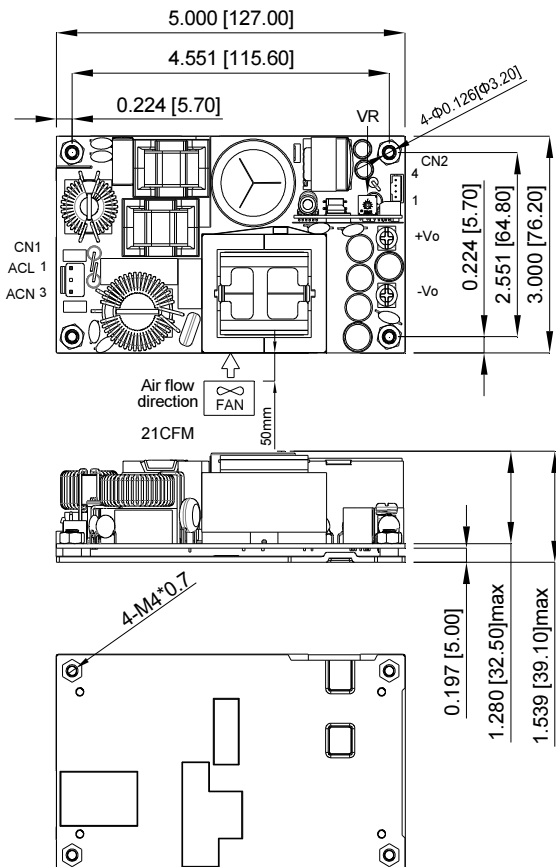
CFM500S360 (Eff Vs Io)



CFM500S480 (Eff Vs Io)



## MECHANICAL SPECIFICATION



CN1:  
PIN CONNECTION

Pin	Function
1	ACL
2	-
3	ACN

CN2:  
PIN CONNECTION

Pin	Function
1	GND
2	+5VSB
3	GND
4	+12V-FAN

CN3:  
PIN CONNECTION

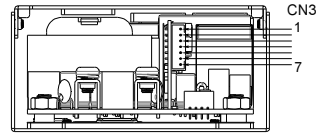
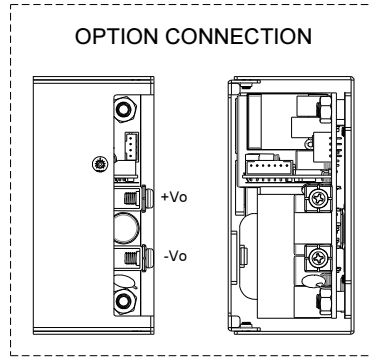
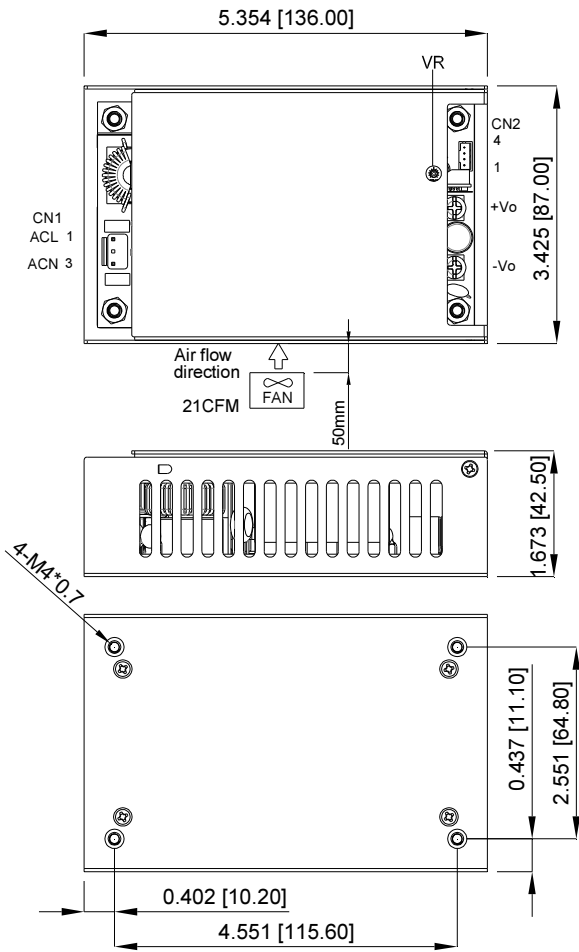
Pin	Function
1	GND
2	PF
3	FAN-EN
4	PS-ON
5	-Sense
6	+Sense
7	OPTION

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

## CFM500SXXX



# CFM500S Series



### CN1: PIN CONNECTION

Pin	Function
1	ACL
2	-
3	ACN

### CN2: PIN CONNECTION

Pin	Function
1	GND
2	+5VSB
3	GND
4	+12V-FAN

### CN3: PIN CONNECTION

Pin	Function
1	GND
2	PF
3	FAN-EN
4	PS-ON
5	-Sense
6	+Sense
7	OPTION

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

## CFM500SXXXC