



electronic powersolutions

# 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
- Class I
- No Load Power Consumption<0.5W
- Peak Power Operation up to 600Watt for 5s
- Approval IEC/EN/UL 62368-1
- Approval EN 55032, 47 CFR FCC Part 15
- Active PFC Meets EN 61000-3-2
- Design Meets IEC/EN 60335-1
- Operating Altitude 5000m
- High Power Density up to 21.64W/Inch<sup>3</sup>
- 390W Natural, 470~500W Conduction Convection
- Over Temperature Protection
- PS On/Off Remote Control
- Power Good & Power Fail Signal
- +5V Stand-by, 12V Fan Output
- Low Inrush Current
- Parallel Operation Option (Active Current Sharing)



MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT CURRENT			VOLTAGE ACCURACY NOTE2	RIPPLE & NOISE NOTE3	VOLTAGE ADJ. RANGE	LINE REGULATION NOTE4	LOAD REGULATION NOTE5	%EFF. (Typ.)	
		NOTE1		COVER							OPEN
		With FAN	Without FAN								
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%	100mV	---	±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 100% 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 BW.
4. Line regulation is measured from high line to low line with 100% full load.
5. Load regulation is measured from 10% to 100% full 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	Function	Output Terminal
CFM500	X	XXX	X (Option)	-XX(Option)	-X(Option)
CFM500	S : Single	120 : 12V 180 : 18V 240 : 24V 360 : 36V 480 : 48V	None : With Baseplate C : With Cover	PC : Parallel Control	None : Vertical R : Horizontal

Part Number Example:

- CFM500S120:** With Baseplate, 500W, 12Vdc Output, Vertical Type Terminal
- CFM500S120C:** With Cover, 500W, 12Vdc Output, Vertical Type Terminal
- CFM500S120-R:** With Baseplate, 500W, 12Vdc Output, Horizontal Type Terminal
- CFM500S120C-R:** With Cover, 500W, 12Vdc Output, Horizontal Type Terminal
- CFM500S120-PC:** With Baseplate, 500W, 12Vdc Output, Parallel Control, Vertical Type Terminal



## 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>
Operating Temperature	See Derating Curve	All	-40		85	°C
Maximum Case Temperature	At the Center of Base Plate (T <sub>c</sub> = Case temperature)	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% Full Load, V <sub>in</sub> =100V <sub>ac</sub>	All			6	A
Power Factor	V <sub>in</sub> =230V <sub>ac</sub>	All		0.97		
Leakage Current (Earth)		All			300	uA
Leakage Current (Touch)		All			100	uA
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	V <sub>in</sub> =80V <sub>ac</sub> ~264V <sub>ac</sub> , See Derating Curve	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% to 100% 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	%
Peak Power	1. V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub> 2. Ambient temperature=25°C 3. Peak power should be less than 5seconds, with a maximum 10% duty cycle, peak power function by 120% load 5S and 75% load 45S	All		120		%
Short Circuit Protection	Auto recovery	All				
Over Temperature Protection	Auto recovery	All				
Current Sharing Accuracy	50% to 100% full load	Option	-5		+5	%



# CFM500S 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 2. Oscilloscope is 20MHz bandwidth 3. Ambient temperature=25°C	CFM500S120			120	mV
		CFM500S180			150	
		CFM500S240			150	
		CFM500S360			200	
		CFM500S480			250	
Load Capacitance	1. $V_{in}=115V_{ac}$ and $230V_{ac}$ 2. Output is 100% full load 3. Ambient temperature=25°C	CFM500S120			42900	uF
		CFM500S180			28600	
		CFM500S240			20800	
		CFM500S360			14000	
		CFM500S480			10800	
Efficiency	1. $V_{in}=230V_{ac}$ 2. Output is 100% full load 3. Ambient temperature=25°C	CFM500S120		92.5		%
		CFM500S180		93.5		
		CFM500S240		94.5		
		CFM500S360		94.5		
		CFM500S480		94.5		
PS-On Signal	Power on	All	0		2	$V_{dc}$
	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. $V_{in}=80V_{ac}\sim 264V_{ac}$ 2. Output is 100% full load 3. The TTL goes high after power set up	All	100		500	ms
Power Fail (PF)	1. $V_{in}=80V_{ac}\sim 264V_{ac}$ 2. Output is 100% full load 3. The TTL goes low before $V_o$ 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	$V_{ac}$
Input to Earth (Ground)	1 Minute (without dielectric breakdown)	All			1800	$V_{ac}$
Output to Earth (Ground)	1 Minute (without dielectric breakdown)	All			1800	$V_{ac}$
Isolation Resistance	Input to output	All	100			MΩ

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	$P_{out}=\max.$ rated power	All		65		kHz
Output Voltage adjustment		All	-5		+5	%

## GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_o=100\%$ ; $T_a=25^\circ C$ per MIL-HDBK-217F	All		200		k hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5, Table 516.5-I 10ms, each axis 3 times ( $\pm X$ 、 $\pm Y$ 、 $\pm Z$ 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 (127.00x76.20x39.10 mm)			
	C (with cover)		5.354x3.425x1.673 Inches (136.00x87.00x42.50 mm)			



## GENERAL SPECIFICATIONS

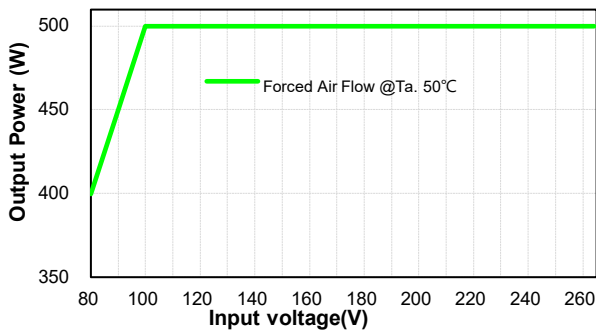
<b>Safety</b>	Class I, IEC 62368-1:2014, EN 62368-1:2014/A11:2017, UL 62368-1	Ed 3.0
<b>EMC Emission</b>	EN 55032:2015+AC:2016, EN 61000-6-3 2007+A1: 2011+AC: 2012, Class B EN 61000-6-4:2007+A1:2011, 47 CFR FCC Part 15 Subpart B (Class B) EN 61204-3:2000, EN 61000-3-2:2014, EN 61000-3-3:2013	
Conducted Disturbance	EN 55032:2015+AC:2016, EN 61000-6-3 2007+A1: 2011+AC: 2012, Class B EN 61000-6-4:2007+A1:2011, 47 CFR FCC Part 15 Subpart B (Class B)	Class B
Radiated Disturbance	EN 55032:2015+AC:2016, EN 61000-6-3 2007+A1: 2011+AC: 2012, Class B EN 61000-6-4:2007+A1:2011, 47 CFR FCC Part 15 Subpart B (Class B)	Class B
Harmonic Current Emissions	IEC 61000-3-2:2014	Class A, C, D
Voltage Fluctuations & Flicker	IEC 61000-3-3:2013	
<b>EMC Immunity</b>	EN 55035:2017, EN61000-6-1:2019+CRGD:2018, EN 61000-6-2:2019 EN 61204-3:2000, IEC 61000-4-2, 3, 4, 5, 6, 8, 11	
Electrostatic Discharge (ESD)	IEC 61000-4-2:2008, Air Discharge: ±8kV, Contact Discharge: ±4kV	Criterion A
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3:2006+A1:2007+A2:2010	Criterion A
Electrical Fast Transient (EFT)	IEC 61000-4-4:2012, ±1kV, ±2kV	Criterion A
Surge	IEC 61000-4-5:2014+A1:2017, L-N: ±0.5kV, ±1kV, L-E(Ground): ±0.5kV, ±1kV, ±2kV	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+A1:2017, Dip: 30% Reduction, Dip >95% Reduction	Criterion A
Voltage Interruptions	IEC 61000-4-11:2004+A1:2017, >95% Reduction	Criterion B
Application Note Link	<a href="#">CFM500S Series App Notes</a>	

## CHARACTERISTIC CURVE

### Power Derating Curve

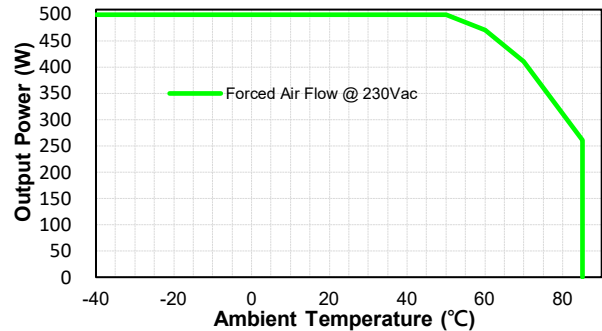
#### Forced Air Flow

Output power & Input voltage



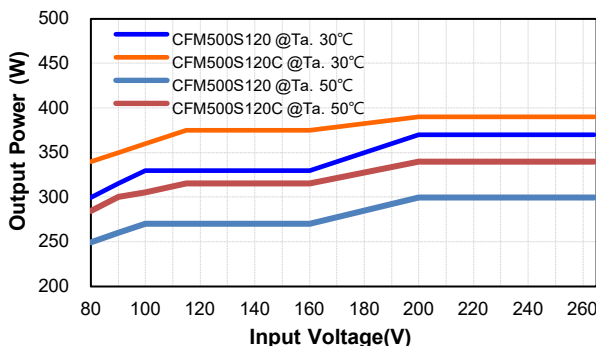
#### Forced Air Flow

Output power vs Ambient Temperature



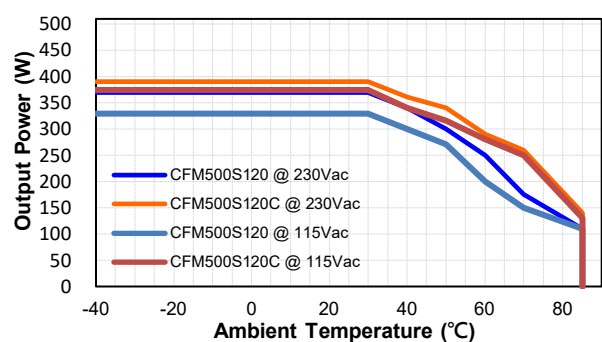
#### Natural Convection

Output power & Input Voltage



#### Natural Convection

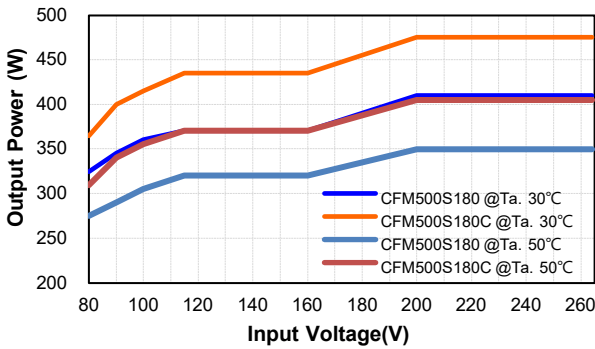
Output power vs Ambient Temperature



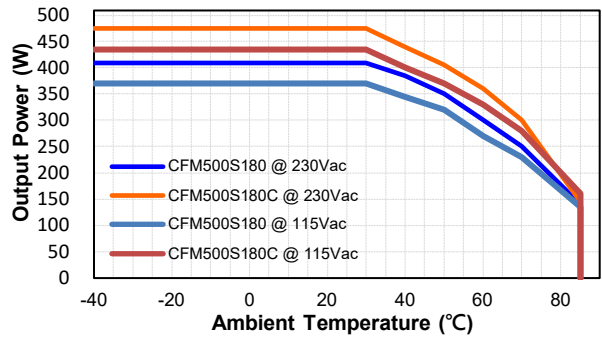


# CFM500S Series

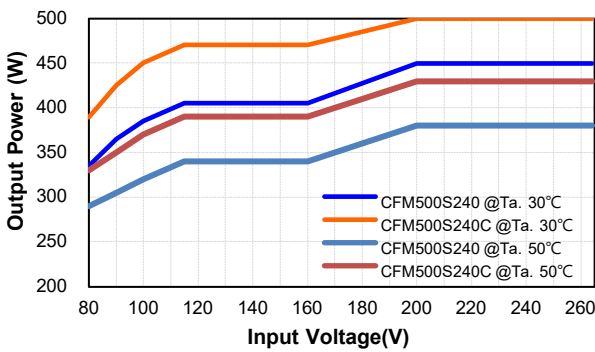
### Output power & Input Voltage



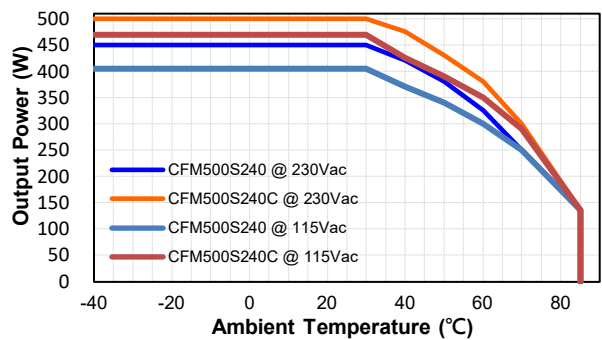
### Output power vs Ambient Temperature



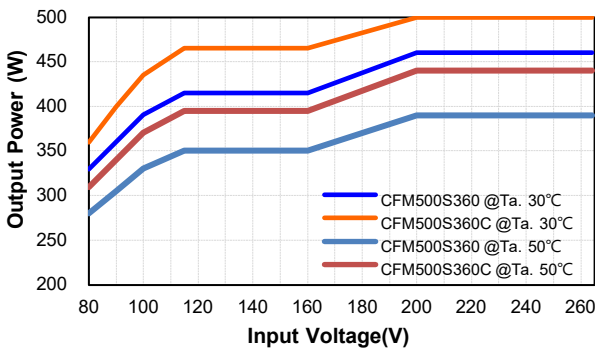
### Output power & Input Voltage



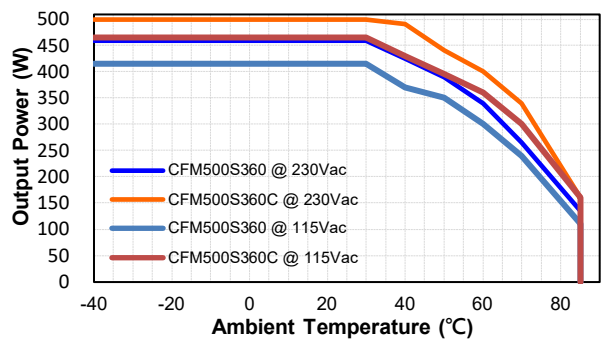
### Output power vs Ambient Temperature



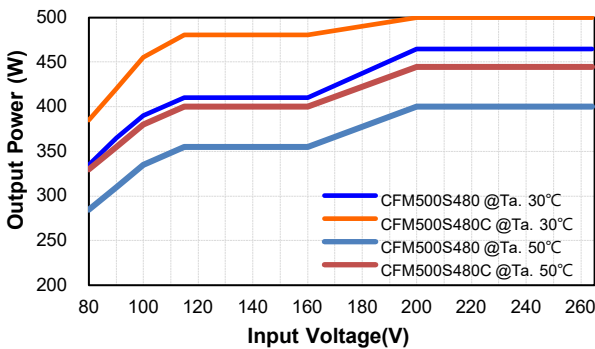
### Output power & Input Voltage



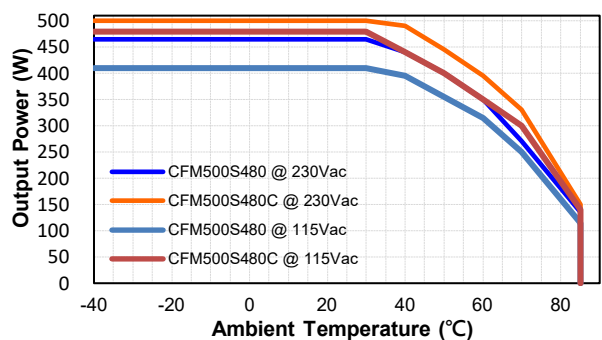
### Output power vs Ambient Temperature



### Output power & Input Voltage



### Output power vs Ambient Temperature



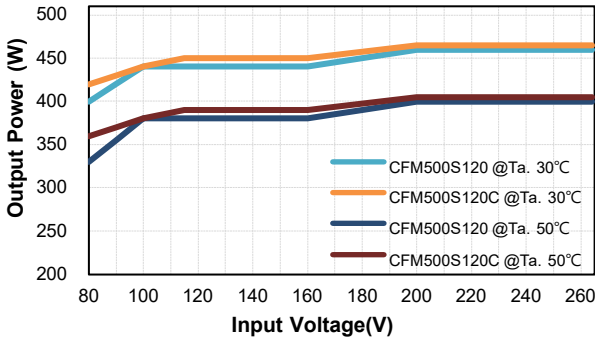


# CFM500S Series

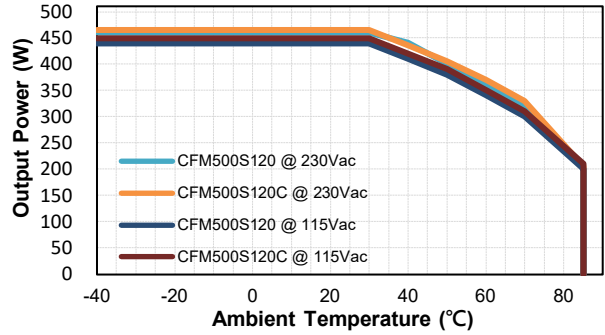
## Conduction Convection with External Baseplate (48x24.8x0.12cm)

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

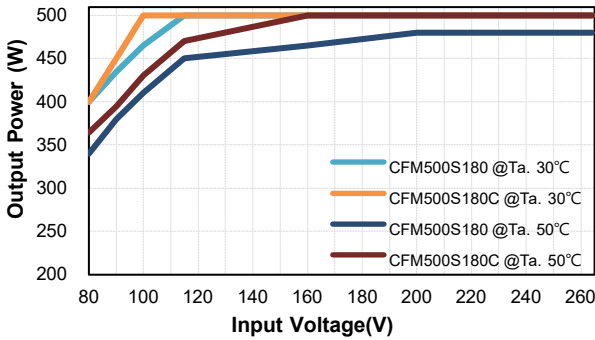
Output power & Input Voltage



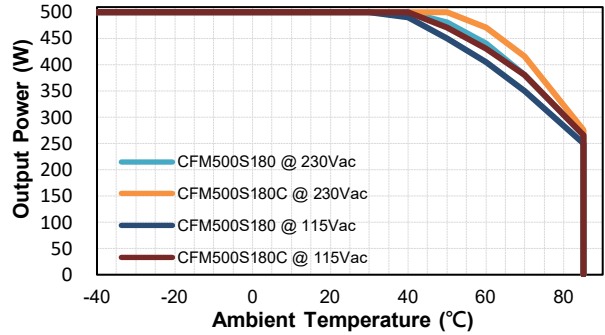
Output power vs Ambient Temperature



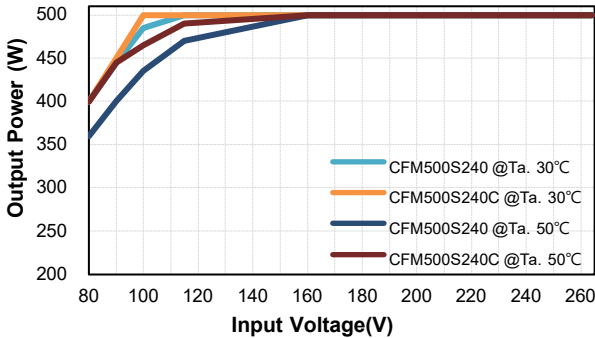
Output power & Input Voltage



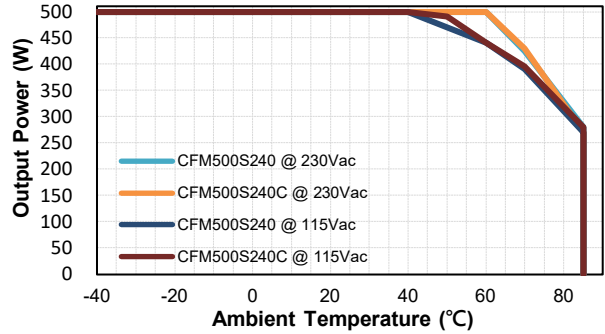
Output power vs Ambient Temperature



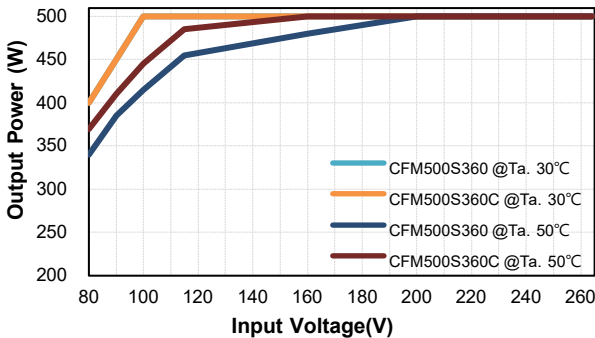
Output power & Input Voltage



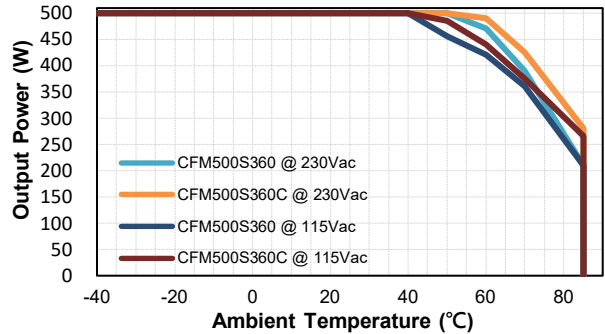
Output power vs Ambient Temperature



Output power & Input Voltage



Output power vs Ambient Temperature

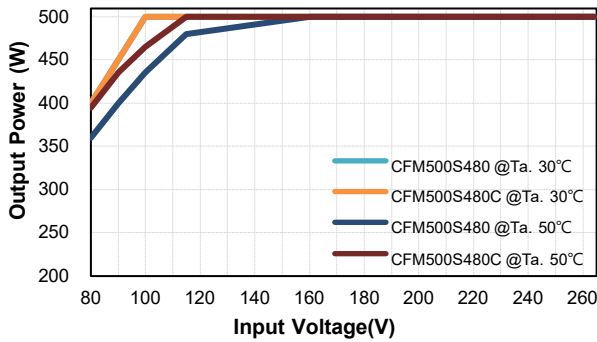




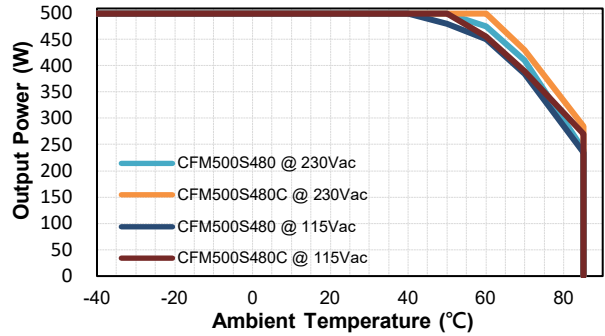


# CFM500S Series

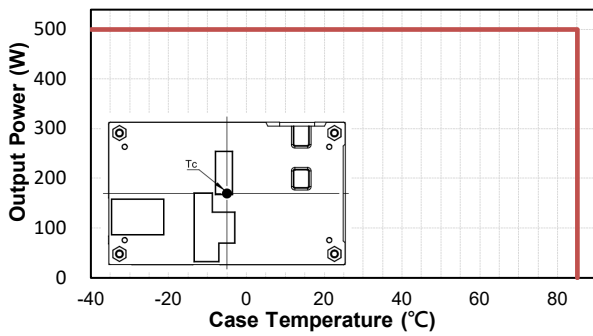
### Output power & Input Voltage



### Output power vs Ambient Temperature

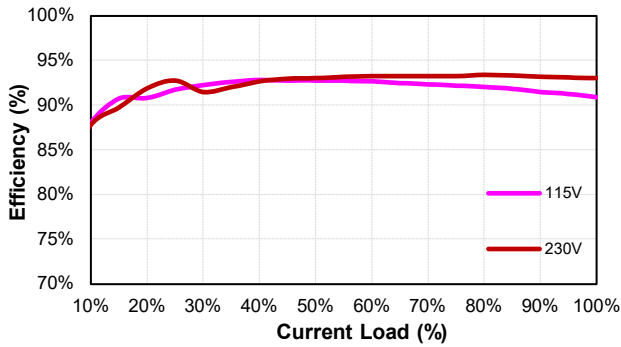


### Output Power vs Case Temperature (Tc)

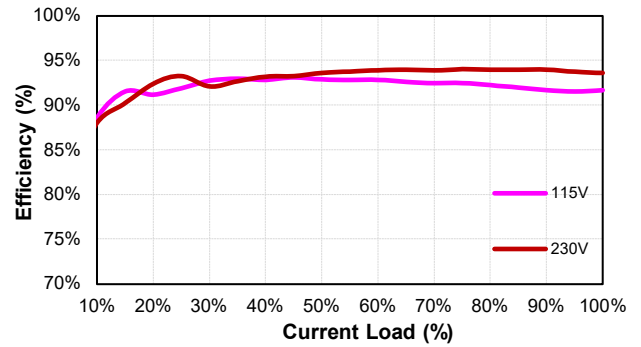


## Performance Data

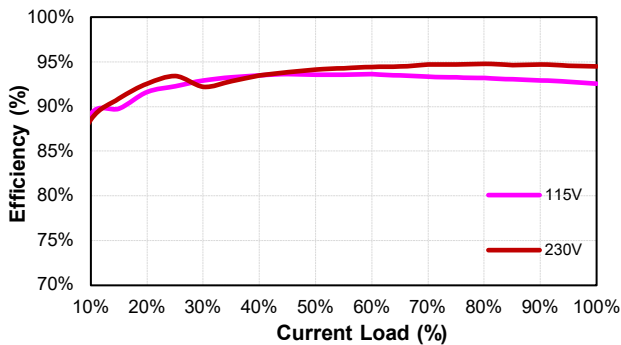
### CFM500S120 (Eff Vs Io)



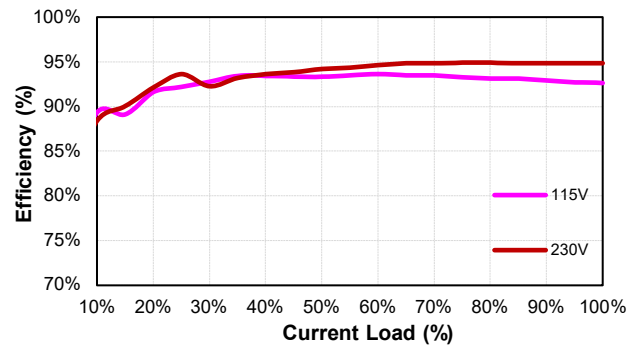
### CFM500S180 (Eff Vs Io)



### CFM500S240 (Eff Vs Io)

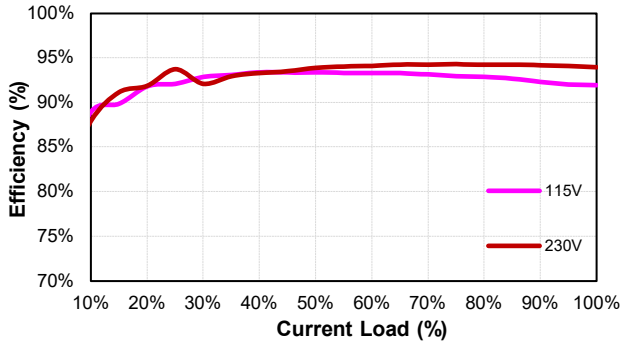


### CFM500S360 (Eff Vs Io)

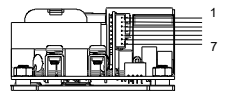
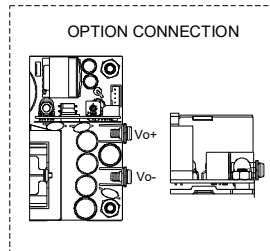
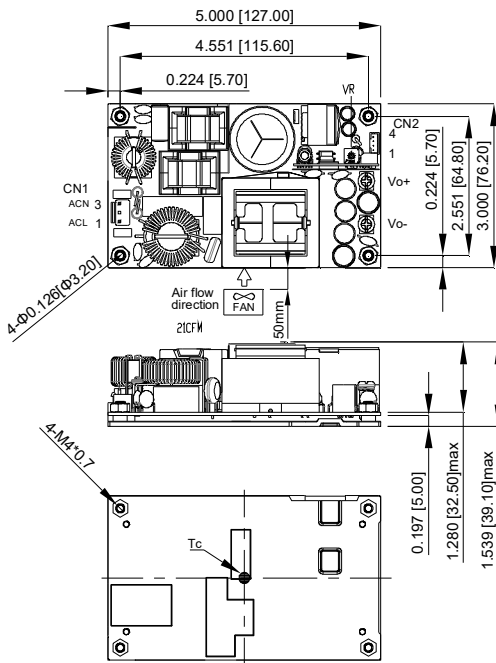




**CFM500S480 (Eff Vs Io)**



## MECHANICAL SPECIFICATION



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

## CFM500SXXX

AC Input Connector(CN1):JST B2P3-VH or equivalent

Pin	Function	Mating Housing	Terminal
1	ACL	JST VHR-3N or equivalent	JST SVH-41T-P1.1 or equivalent
2	-		
3	ACN		

DC Output Connector(CN2):TKP P110I-04 or equivalent

Pin	Function	Mating Housing	Terminal
1	GND	JST PHR-4 or equivalent	JST SPH-002T-P0.5L or equivalent
2	+5VSB		
3	GND		
4	+12V-FAN		

DC Output Connector(CN3):TKP P110L-07 or equivalent

Pin	Function	Mating Housing	Terminal
1	GND	JST PHR-7 or equivalent	JST SPH-002T-P0.5L or equivalent
2	PF		
3	FAN-EN		
4	PS-ON		
5	-Sense		
6	+Sense		
7	PC(Optional)		

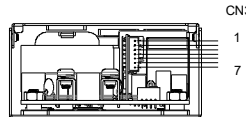
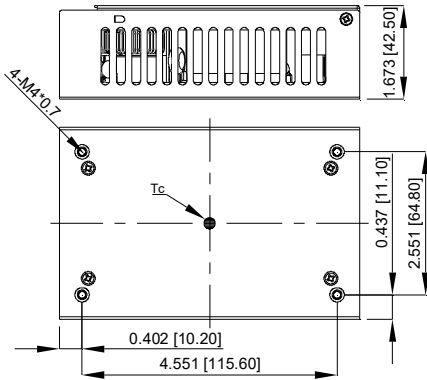
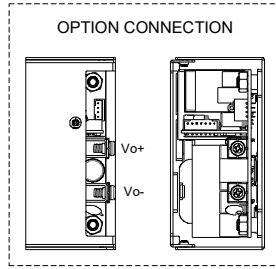
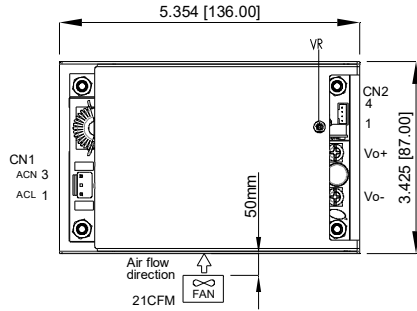
DC Output Connector:KANG YANG PCB-58M4 or equivalent

Function	The Screw Locked Torque
Vo-	M4 7kgf-cm
Vo+	





## MECHANICAL SPECIFICATION



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

## CFM500SXXXC

AC Input Connector(CN1):JST B2P3-VH or equivalent

Pin	Function	Mating Housing	Terminal
1	ACL	JST VHR-3N or equivalent	JST SVH-41T-P1.1 or equivalent
2	-		
3	ACN		

DC Output Connector(CN2):TKP P110I-04 or equivalent

Pin	Function	Mating Housing	Terminal
1	GND	JST PHR-4 or equivalent	JST SPH-002T-P0.5L or equivalent
2	+5VSB		
3	GND		
4	+12V-FAN		

DC Output Connector(CN3):TKP P110L-07 or equivalent

Pin	Function	Mating Housing	Terminal
1	GND	JST PHR-7 or equivalent	JST SPH-002T-P0.5L or equivalent
2	PF		
3	FAN-EN		
4	PS-ON		
5	-Sense		
6	+Sense		
7	PC(Optional)		

DC Output Connector:KANG YANG PCB-58M4 or equivalent

Function	The Screw Locked Torque
Vo-	M4 7kgf-cm
Vo+	