CFM400S SERIES
400 WATT AC-DC POWER SUPPLY WITH PFC

Features

- Universal Input Range 80~264V_{ac}
- High Efficiency up to 94%
- 3”x 5” Compact Size
- Class I
- No Load Power Consumption<0.5W (PS-Off)
- Approval IEC/EN/UL 62368-1
- Approval EN 55032, 47 CFR FCC Part 15
- Active PFC Meets EN 61000-3-2
- Meets IEC/EN 60335-1
- High Power Density up to 17.3W/Inch^3
- 370W Natural, 400W Conduction Convection
- Over Temperature Protection
- PS On/Off Remote Control
- Power Good & Power Fail Signal
- +5V Stand-by, 12V Fan Output
- Low Inrush Current

E176177

MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT CURRENT NOTE1			VOLTAGE ACCURACY NOTE2	RIPPLE& NOISE NOTE3	VOLTAGE ADJ. RANGE	LINE REGULATION NOTE4	LOAD REGULATION NOTE5	%EFF. (Typ.)
		With FAN	Without FAN							
			COVER	OPEN						
CFM400S120	12 V	33.33 A	26.67 A	23.33 A	±1%	120 mV	11.4~12.6 V	±0.5%	±1%	92%
CFM400S180	18 V	22.22 A	17.78 A	15.56 A	±1%	150 mV	17.1~18.9 V	±0.5%	±1%	93%
CFM400S240	24 V	16.67 A	13.33 A	11.67 A	±1%	150 mV	22.8~25.2 V	±0.5%	±1%	94%
CFM400S360	36 V	11.11 A	8.89 A	7.78 A	±1%	200 mV	34.2~37.8 V	±0.5%	±1%	94%
CFM400S480	48 V	8.33 A	6.67A	5.83 A	±1%	250 mV	45.6~50.4 V	±0.5%	±1%	94%
CFM400S540	54 V	7.40 A	5.93 A	5.19 A	±1%	300 mV	51.3~56.7 V	±0.5%	±1%	94%
Stand-by Output Voltage										
All	+5 V	1A (Note 7)			±3%	100 mV	---	±1%	±5%	---
Fan Output Voltage										
All	+12 V	0.5A (Note 6)			---	---	---	---	---	---

Note:

1. V_{in}=230V_{ac}, Forced air convection with 21.9CFM fan.
2. Voltage accuracy is set at 100% full load and 25℃ 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.
7. When PS-OFF, at -40℃, stand-by output voltage with CC load 1A requires input voltage above 100V_{ac}.

PART NUMBER

Series	Number of Outputs	Nominal Output Voltage	Type	Output Terminal
CFM400	X	XXX	X (Option)	-X(Option)
CFM400	S：Single	120：12V 180：18V 240：24V 360：36V 480：48V 540：54V	None：With Baseplate C：With Cover	None：Vertical R：Horizontal

Part Number Example:

CFM400S120: With Baseplate, 400W, 12Vdc Output, Vertical Type Terminal

CFM400S120C-R: With Cover, 400W, 12Vdc Output, Horizontal Type Terminal

TECHNICAL SPECIFICATIONS

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

ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Safety only 90~264 V_{ac}	All	80		264	V_{ac}
Operating Temperature	See derating curve	All	-40		85	℃
Storage Temperature		All	-40		85	℃
Operating Altitude		All			5000	m

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Voltage Range		All	100		240	V_{ac}
Input Frequency Range	Safety 50-60HZ	All	47		63	Hz
Maximum Input Current	100% Full load, V_{in}=100V_{ac}	All			6	A
Power Factor	V_{in}=230V_{ac} Full load	All		0.95		
Leakage Current	Contact leakage current Earth leakage current	All			0.1 0.3	mA
Inrush Current	V_{in}=240V_{ac}, Cold start at 25℃	All		30		A

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Set Point	V_{in}=Nominal V_{in}, I_o=Io max., T_c=25℃	CFM400S120	11.88	12	12.12	V_{dc}
		CFM400S180	17.82	18	18.18	
		CFM400S240	23.76	24	24.24	
		CFM400S360	35.64	36	36.36	
		CFM400S480	47.52	48	48.48	
		CFM400S540	53.46	54	54.54	
Operating Output Current Range	Vin=80V_{ac}~264V_{ac}, See Derating Curve	CFM400S120			33.33	A
		CFM400S180			22.22	
		CFM400S240			16.67	
		CFM400S360			11.11	
		CFM400S480			8.33	
		CFM400S540			7.40	
Holdup Time	V_{in}=115V_{ac}	All		10		ms
Output Voltage Regulation						
Load Regulation	10% to 100% full load	All			±1.0	%
Line Regulation	V_{in}=High line to low line	All			±0.5	%
Over Voltage Protection	Latch off (AC recycle to reset)	CFM400S120			16	V_{dc}
		CFM400S180			30	
		CFM400S240			35	
		CFM400S360			50	
		CFM400S480			63	
		CFM400S540			63	
Over Current Protection	Auto recovery	All	110		190	%
Short Circuit Protection	Auto recovery	All				
Over Temperature Protection	Auto recovery	All				

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℃	CFM400S120			120	mV
		CFM400S180			150	
		CFM400S240			150	
		CFM400S360			200	
		CFM400S480			250	
		CFM400S540			300	
Load Capacitance	1. V_{in}=115V_{ac} and 230V_{ac} 2. Output is 100% full load 3. Ambient temperature=25℃	CFM400S120			33330	uF
		CFM400S180			22220	
		CFM400S240			16670	
		CFM400S360			11110	
		CFM400S480			8330	
		CFM400S540			7400	
Efficiency	1. V_{in}=230V_{ac} 2. Output is 100% full load 3. Ambient temperature=25℃	CFM400S120		92.0		%
		CFM400S180		93.0		
		CFM400S240		94.0		
		CFM400S360		94.0		
		CFM400S480		94.0		
		CFM400S540		94.0		
PS-On Signal	Power on	All	0		2	V_{dc}
	Power off (PS-ON and GND open)			4		mA
	Power on (PS-ON and GND short)			10		
	Power-off (PS-ON and GND open)			0		
Power Good (PG)	1. Vin=80V_{ac}~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. Vin=80V_{ac}~264V_{ac} 2. Output is 100% full 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	3000		4000	V_{ac}
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_o=100%; T_a=25℃ per MIL-HDBK-217F	All		300		k hours
	I_o=100%, Ta=25℃, Telcordia SR332		1250			
Humidity	Non-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

GENERAL SPECIFICATIONS

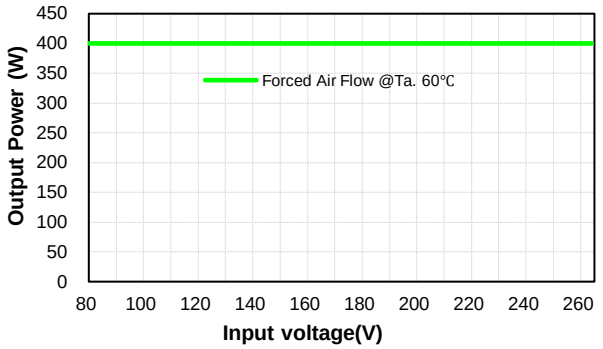
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Weight	Baseplate versions Covered versions	All		470 550		g
Dimensions	With baseplate C (with cover)	All		5.000x3.000x1.540 Inches (127.00x76.20x39.10 mm) 5.354x3.425x1.673 Inches (136.00x87.00x42.50 mm)		
Safety	Class I, EN/IEC/UL 62368-1					Ed3.0
EMC Emission	EN 55032:2015+A11:2020, EN 61000-6-3 2007+A1: 2011+AC: 2012, Class B EN IEC 61000-6-4:2019, 47 CFR FCC Part 15 Subpart B (Class B) EN IEC 61204-3:2018, EN IEC 61000-3-2:2019, EN 61000-3-3:2013+A1:2019					
Conducted Disturbance	EN 55032:2015+A11:2020, EN 61000-6-3 2007+A1: 2011+AC: 2012, Class B EN IEC 61000-6-4:2019, 47 CFR FCC Part 15 Subpart B (Class B), EN IEC 61204-3:2018					Class B
Radiated Disturbance	EN 55032:2015+A11:2020, EN 61000-6-3 2007+A1: 2011+AC: 2012, Class B EN IEC 61000-6-4:2019, 47 CFR FCC Part 15 Subpart B (Class B), EN IEC 61204-3:2018					Class B
Harmonic Current Emissions	EN IEC 61000-3-2:2019					Class A, C
Voltage Fluctuations & Flicker	EN 61000-3-3:2013+A1:2019					
EMC Immunity	EN 55035:2017+A11:2020, EN IEC 61000-6-1:2019, EN IEC 61000-6-2:2019 EN IEC 61204-3:2018, 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 61000-4-3:2020					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 61000-4-11:2020, Dip: 30% Reduction, Dip >95% Reduction					Criterion A
Voltage Interruptions	IEC 61000-4-11:2020, >95% Reduction					Criterion B
Application Note Link						CFM400S Series App Notes

CHARACTERISTIC CURVE

Power Derating Curve

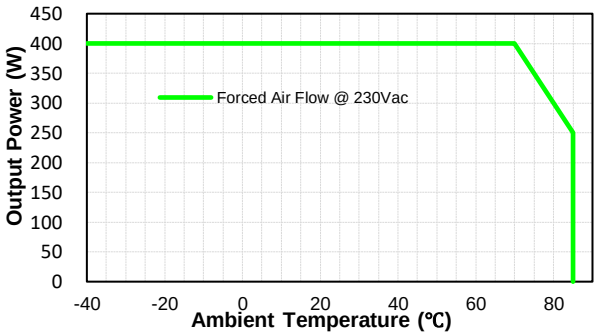
Forced Air Flow

Output power & Input voltage



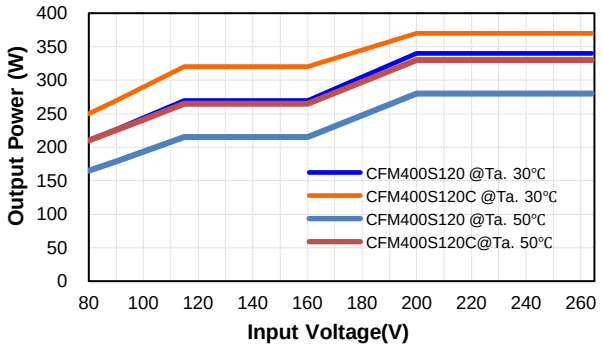
Forced Air Flow

Output power vs Ambient Temperature



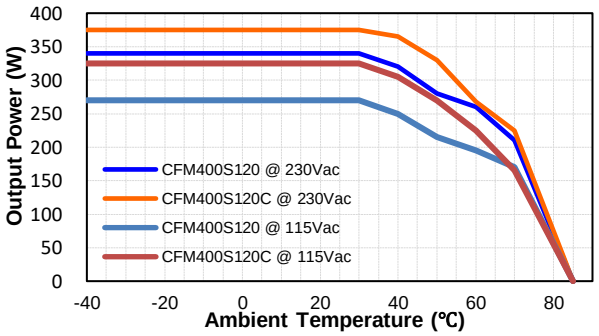
Natural Convection

Output power & Input Voltage

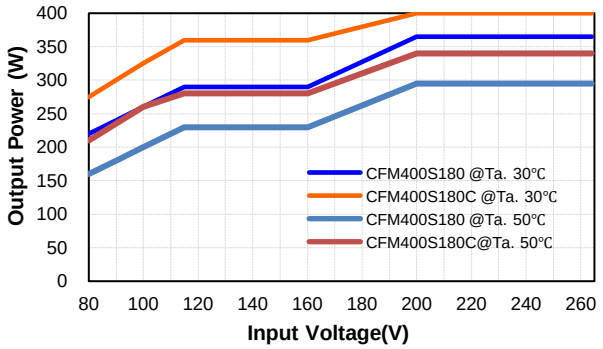


Natural Convection

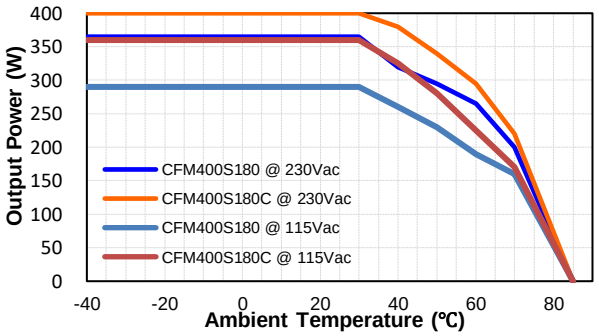
Output power vs Ambient Temperature



Output power & Input Voltage



Output power vs Ambient Temperature



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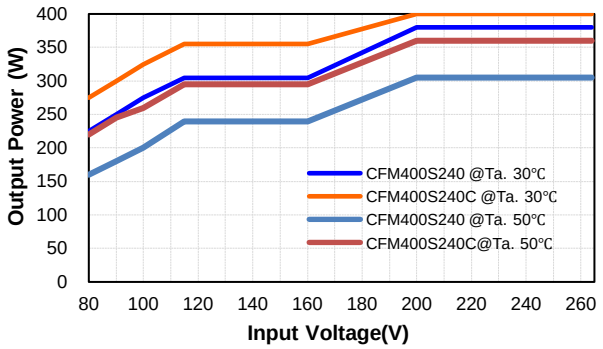

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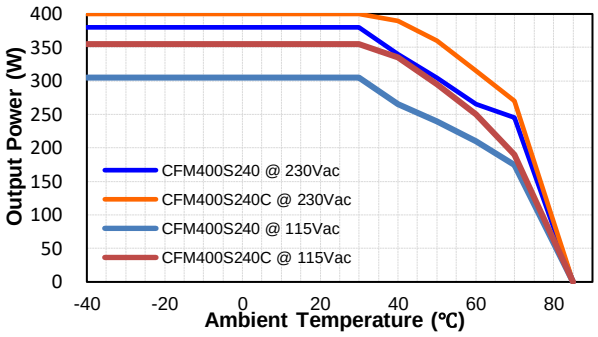

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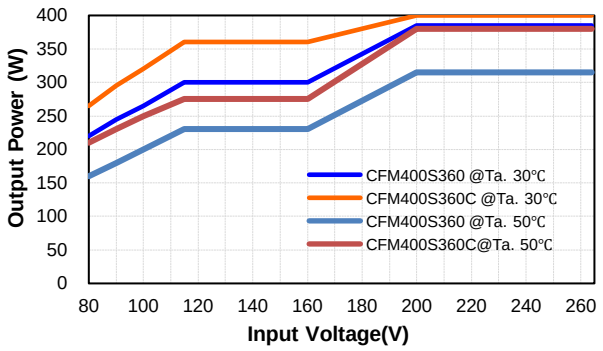
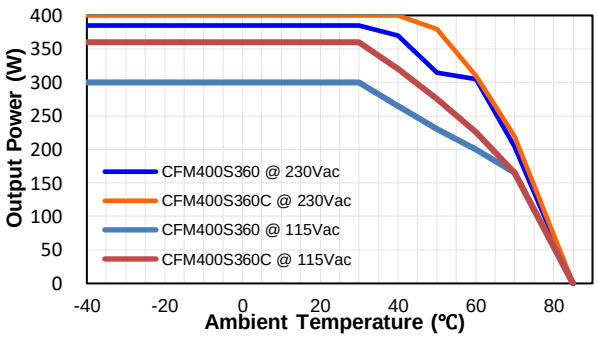


Output power vs Ambient Temperature



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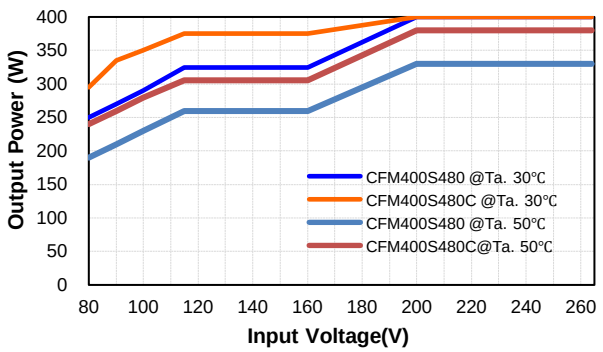
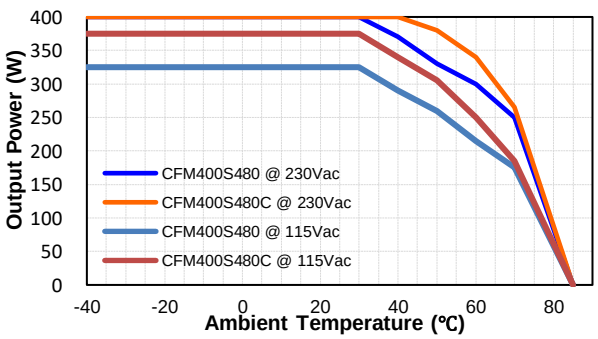


Output power vs Ambient Temperature



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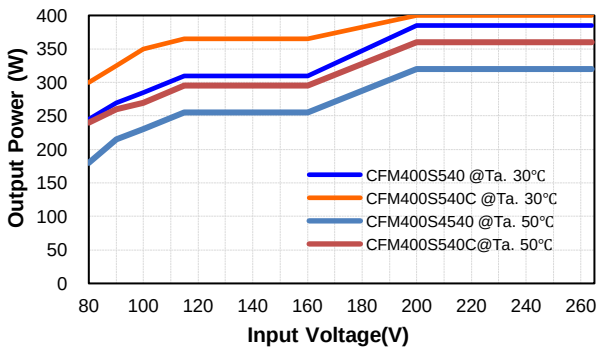
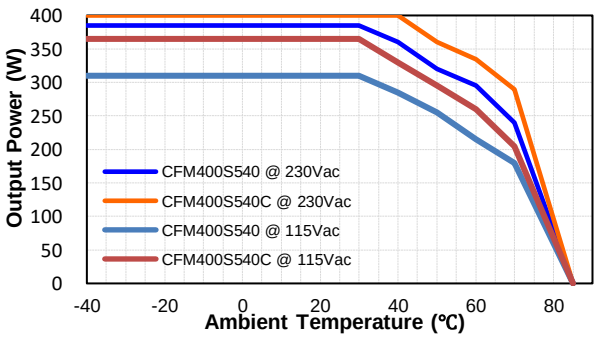
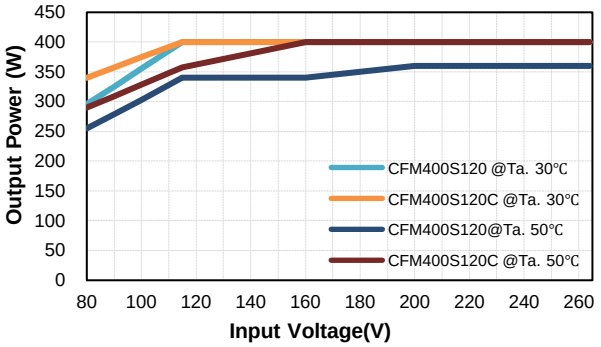


Output power vs Ambient Temperature



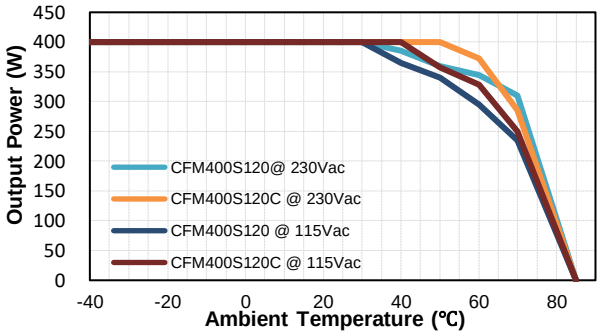
Conduction Convection with External Baseplate (48x24.8x0.12cm)

Output power & Input Voltage



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

Output power vs Ambient Temperature



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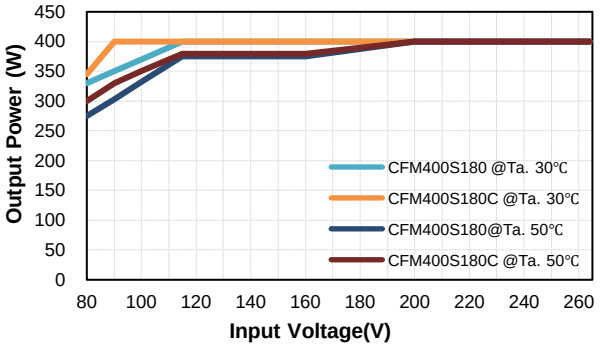
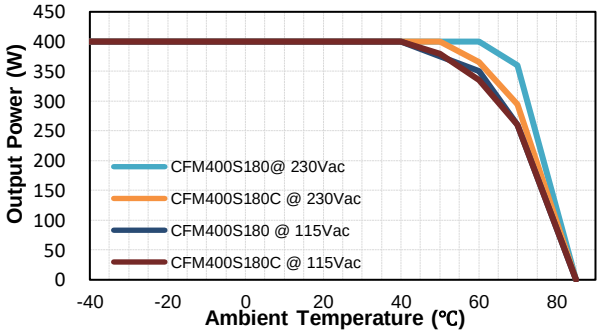


Output power vs Ambient Temperature



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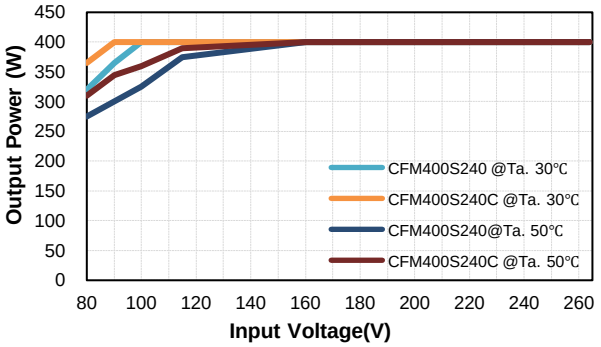
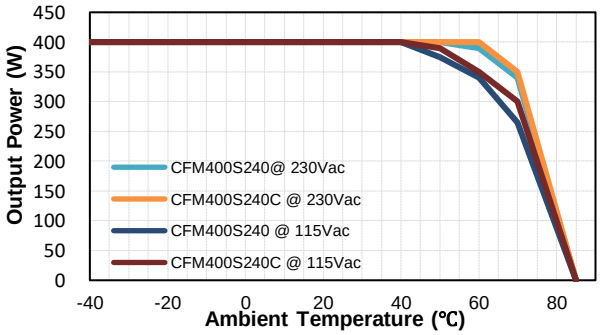


Output power vs Ambient Temperature



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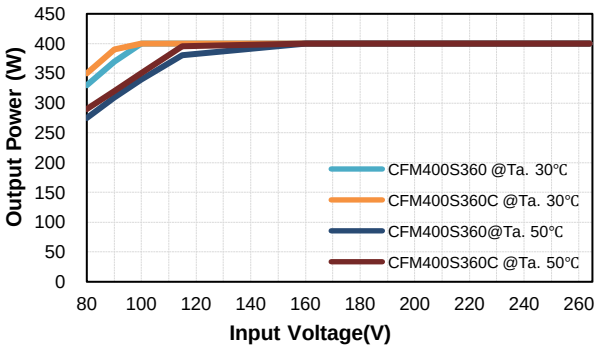
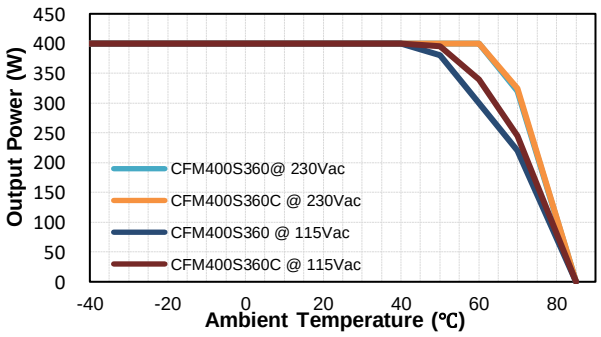
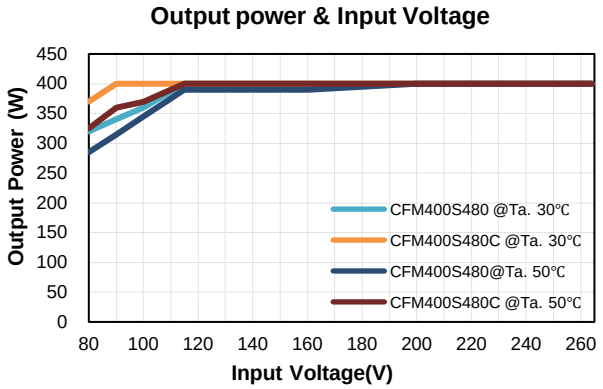
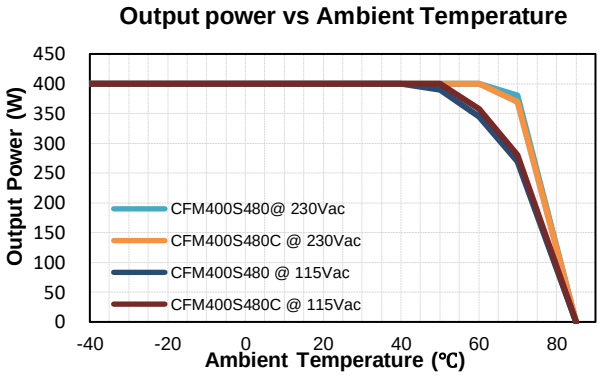
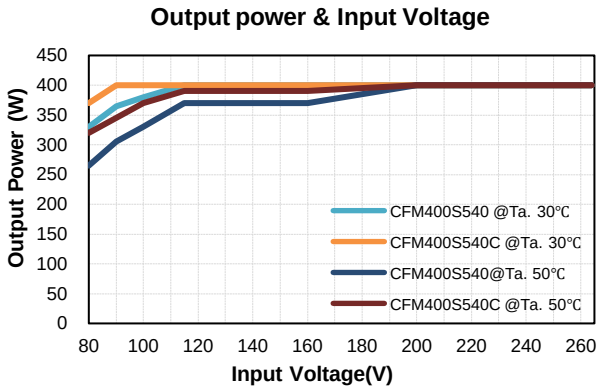


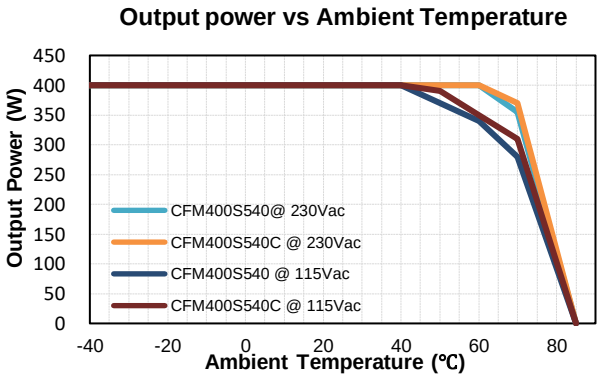
Output power vs Ambient Temperature



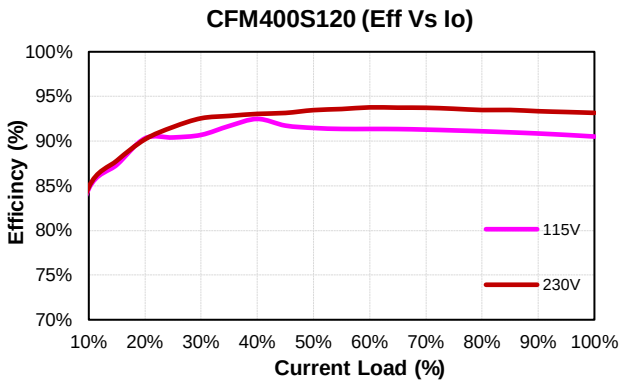


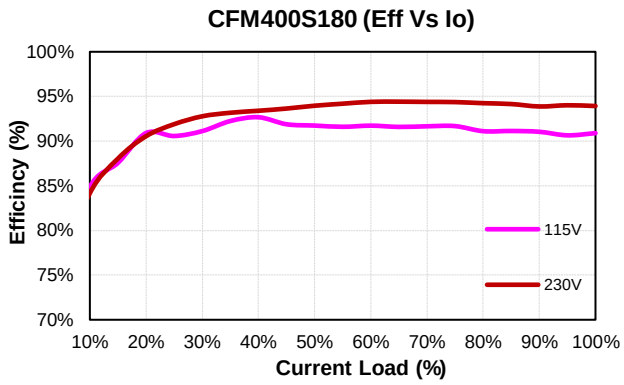


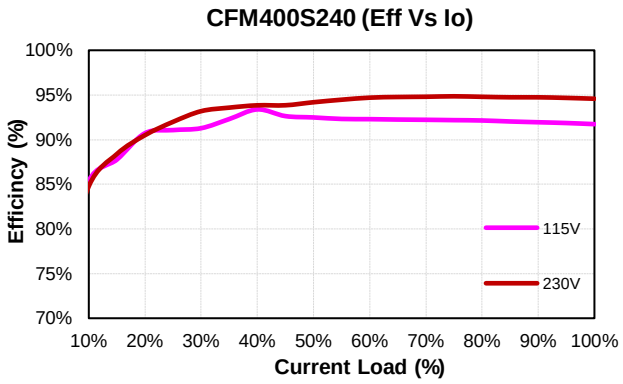


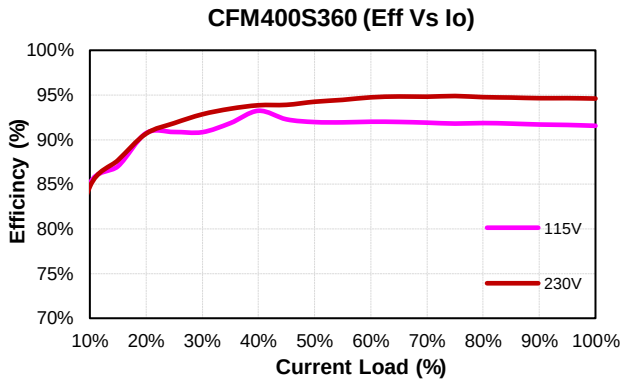


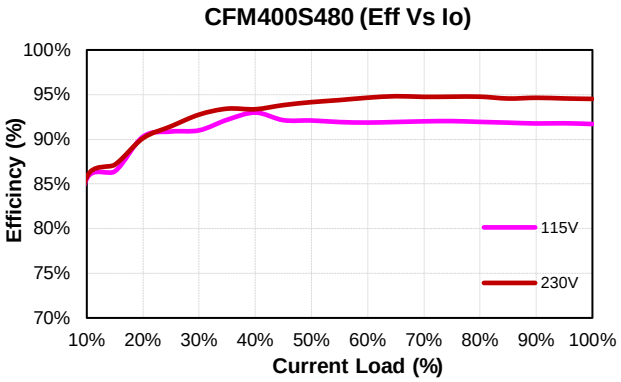
Performance Data

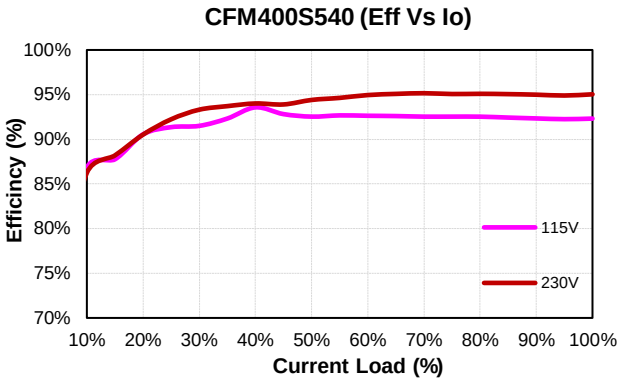




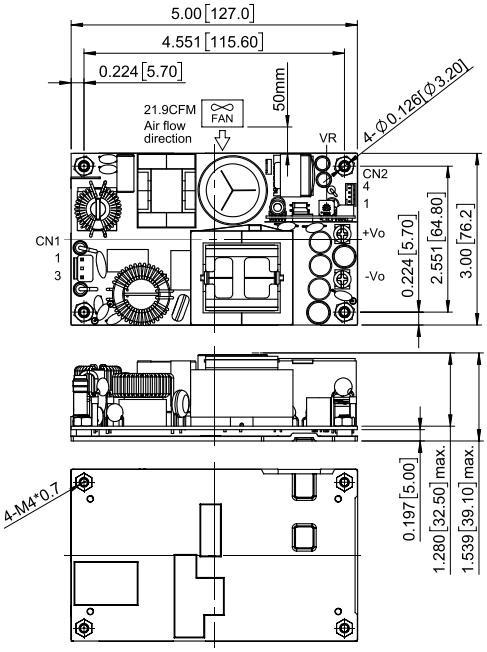


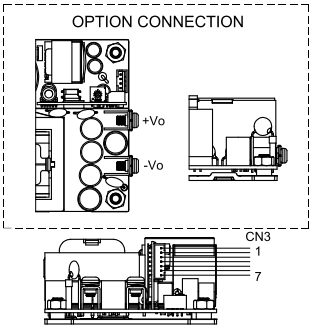






MECHANICAL SPECIFICATION





CFM400SXXX

All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.03, x .xxx=±0.020
Millimeters: x.x=±0.7, x.xx=±0.50

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

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

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		

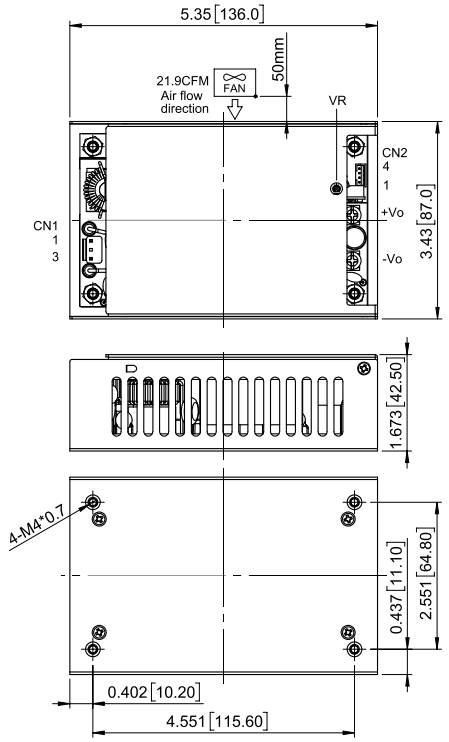
DC Output Connector(CN3):TKP P110L-07 or equivalent

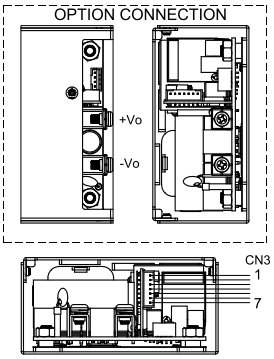
Pin	Function	Mating Housing	Terminal
1	GND	JST PHR-7 or equivalent	JST SPH-002T-P0.5L or equivalent
2	PG/PF		
3	FAN-EN		
4	PS-ON		
5	-Sense		
6	+Sense		
7	Option		

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

Function	The screw locked torque
Vo-	M4 7kgf-cm
Vo+	

MECHANICAL SPECIFICATION





CFM400SXXXC

All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.03, x .xxx=±0.020
Millimeters: x.x=±0.7, x.xx=±0.50

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

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

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	PG/PF		
3	FAN-EN		
4	PS-ON		
5	-Sense		
6	+Sense		
7	Option		

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

Function	The screw locked torque
Vo-	M4 7kgf-cm
Vo+	

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