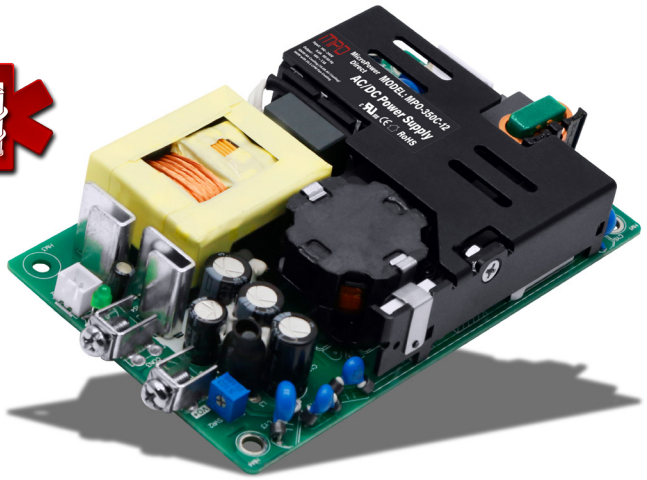
MPO-350C

Very Compact, 350W Industrial/Medical AC/DC Power Supplies



Key Features:

- 350W Output Power
- Compact 5" x 3" Size
- 4 kVAC Isolation
- UL 60601 Approval
- UL 62368 Approval
- Insulation 2 x MOPP
- -40° to +70°C Operation
- Suitable For BF Apps
- Meets EN 55032 B
- Meets EN 60335
- Meets EN 61558
- <0.1mA Leakage Current
- Active PFC

Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

Input

Parameter	Conditions	Min.	Typ.	Max.	Units
Input Voltage Range		90		264	VAC
		127		370	VDC
Input Frequency		47		63	Hz
Input Current	115 VAC			4.0	A
	230 VAC			2.0	
Leakage Current	240 VAC	<0.1 mA; Single Fault<0.5 mA			
Inrush Current, Cold Start	115 VAC		50		A Pk
	230 VAC		75		
Power Factor	115 VAC	0.98			---
	230 VAC	0.95			

Output

Parameter	Conditions		Min.	Typ.	Max.	Units
Output Voltage Accuracy, See Note 10	0-100% Load	12/15/18/19V Output		±3.0		%
		All Other Models		±2.0		
Line Regulation	At Rated Load			±0.5		%
Load Regulation	0 - 100% Load			±1.0		%
Ripple & Noise (20 MHz), See Note 1	12V, 15V, 18V, 19V Output				120	mV
	24V Output				150	
	27V/36V Output				200	
	48V/54V Output				250	
Hold-Up Time, 230 VAC	Air Cooling		12	14		mSec
	20.5 CFM		6	8		
Temperature Coefficient				±0.03		%/°C
Standby Power Consumption	230 VAC				1.0	W
Over Current Protection	Self Recovery		110			%IOUT
Over Temperature Protection	See Note 2					
Temperature Derating	+50°C to +70°C		2.5			%/°C
	-40°C to +50°C		0			
Input Voltage Derating	90 - 100VAC		1.00			%/VAC
	100 - 264VAC		0			
Fan Power, See Note 10	27V Output		12V (+15%/-25%) @ 0.5A			
	18V/19V Output		12V (+25%/-15%) @ 0.5A			
	All Other Models		12V (±15%) @ 0.5A			
Short Circuit Protection, See Note 3	Continuous (Autorecovery)					

General

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation Voltage, See Note 4	Input to Output	4,000			VAC
	Input to Ground	2,000			
	Output to Ground	1,500			
Insulation Resistance	See Note 5	100			MΩ
Isolation Level	Input to Output	2 x MOPP			
	Input/Output to Ground	1 x MOPP			

Environmental

Parameter	Conditions	Min.	Typ.	Max.	Units
Operating Temperature Range	Ambient	-40		+70	°C
Storage Temperature Range		-40		+85	°C
Cooling	Free Air Convection (See Derating Curves)				
Humidity, RH, Non-condensing	Operating	20		90	%
	Storage	10		95	

Physical

Size	5.00 x 3.00 x 1.00 in. (See Mechanical Drawing on Page 5)
Weight	10.41 oz (295g) (See Mechanical Drawing on Page 5)

Reliability Specifications

Parameter	Conditions	Min.	Typ.	Max.	Units
MTBF	MIL HDBK 217F, 25°C, Gnd Benign	300			kHours
Safety Standards	UL/cUL 60601-1 recognition (UL certificate)				
	UL/cUL 62368-1 recognition (UL certificate)				
	EN60335				
Safety Class	Class I (with PE connected), Class II (without PE)				

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Model Selection Guide

	Model Number	Cooling Method	Output					Over Voltage Protection (VDC) See Note 7	Output Capacitive Load (μF Max)	Efficiency @ 230 VAC (%, Typ)
			Voltage (VDC)	Current (A)		Power (W)	Adj Range (VDC)			
				Rated	% Min.					
UL	MPO-350C-12	Air Cooling	12.0	15.0	0.00	180.0	11.40 - 12.60	15.0	6,000	92.0
		20.5 CFM		25.0		300.0				
UL	MPO-350C-15	Air Cooling	15.0	12.0	0.00	180.0	14.25 - 15.75	18.5	5,000	92.0
		20.5 CFM		21.67		325.0				
	MPO-350C-18	Air Cooling	18.0	10.0	0.00	180.0	17.10 - 19.90	23.7	4,000	92.5
		20.5 CFM		18.0		324.0				
	MPO-350C-19	Air Cooling	19.0	9.50	0.00	180.5	17.10 - 19.90	23.7	4,000	92.5
		20.5 CFM		17.10		324.9				
UL	MPO-350C-24	Air Cooling	24.0	8.33	0.00	199.9	22.80 - 25.20	30.0	3,200	93.0
		20.5 CFM		14.60		350.4				
	MPO-350C-27	Air Cooling	27.0	7.40	0.00	199.8	25.65 - 28.35	33.5	2,600	93.0
		20.5 CFM		13.0		351.0				
	MPO-350C-36	Air Cooling	36.0	5.56	0.00	200.1	34.20 - 37.80	45.0	2,000	93.0
		20.5 CFM		9.73		350.2				
	MPO-350C-48	Air Cooling	48.0	4.17	0.00	200.1	45.60 - 50.40	59.5	2,000	94.0
		20.5 CFM		7.30		350.4				
	MPO-350C-54	Air Cooling	54.0	3.70	0.00	199.8	51.30 - 56.70	63.0	2,000	94.0
		20.5 CFM		6.50		351.0				
	* MPO-350C-12, -15, -24 have UL/cUL 62368-1 and 60601-1 recognition (UL certificate). Contact the factory for status of other models.									

Notes:

1. Output ripple is measured at 20 MHz bandwidth using 0.1 μF and 10 μF capacitors connected in parallel as close to the power supply terminals as possible.
2. After an overtemperature fault, the unit power must be recycled for the unit to recover.
3. Output short circuit protection is provided by a "hiccup mode" circuit. The unit recovers <5 seconds after the fault condition is removed.
4. Input-output, input-ground and output-ground isolation are tested for 60 seconds with a leakage current of <5 mA.
5. Insulation resistance is tested at an ambient temperature of 25ºC ± 5ºC, at a relative humidity of <95%RH (no condensation) with a test voltage of 500 VDC. It is given for input to output, input to ground and output to ground.
6. Models with the UL symbol above are approved to UL 60601 & UL 62368.
7. After an overvoltage fault, the unit power must be recycled for the unit to recover.
8. All units include an on-board slow blow fuse.
9. Output voltage accuracy includes the setting error, line regulation, and load regulation. The output voltage can be adjusted by the ADJ knob. Turn clockwise to decrease and counterclockwise to increase.
10. For the fan power connection, please refer to pins 6 & 7 on the mechanical drawings.

The **MPO-350C** is also available with a compact metal case. Contact the factory for more information. (Example **MPO-350C-12-C**)

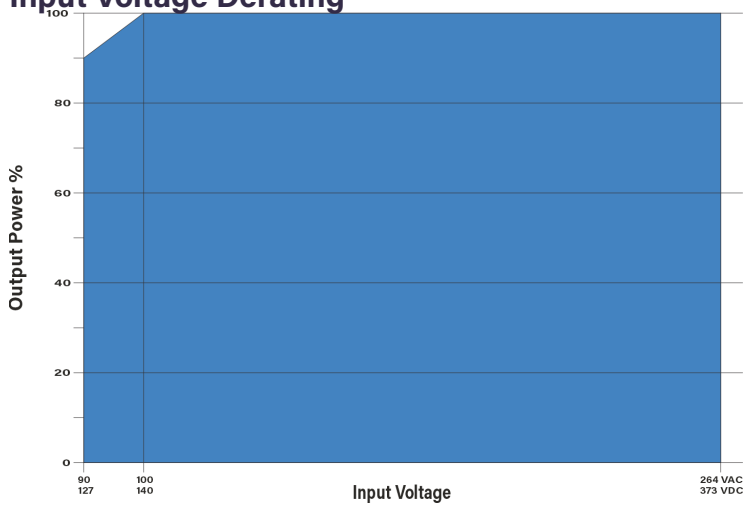
EMC Characteristics

Parameter	Conditions	Criteria	Level
Conducted Emissions	EN 55032		Class B
Radiated Emissions	EN 55032		Class B (Category I)
			Class A (Category II)
Harmonic Current	EN 61000-3-2		Class A, Class D
Voltage Flicker	EN 61000-3-3		
ESD	EN 61000-4-2	A	±15 kV Air
			±8 kV Contact
RS	EN 61000-4-3	A	10V/m
EFT	EN 61000-4-4	A	±2 kV, ±4kV
Surge	EN 61000-4-5	A	±2 kV Line to Line
			±4 kV Line to Gnd
CS	EN 61000-4-6	A	10V rms
Dips	EN 61000-4-11	B	0%, 70%

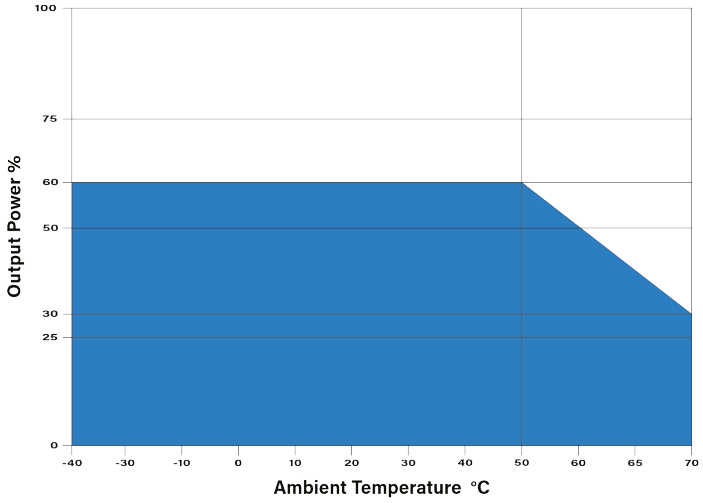
Notes:

1. All EMC tests are conducted on a metal plate measuring 360 x 360 mm with a thickness of 1mm. Contact the factory for more information.

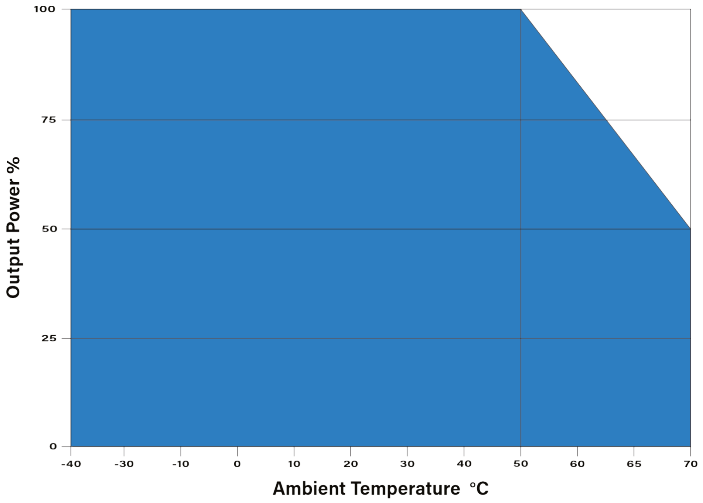
Input Voltage Derating



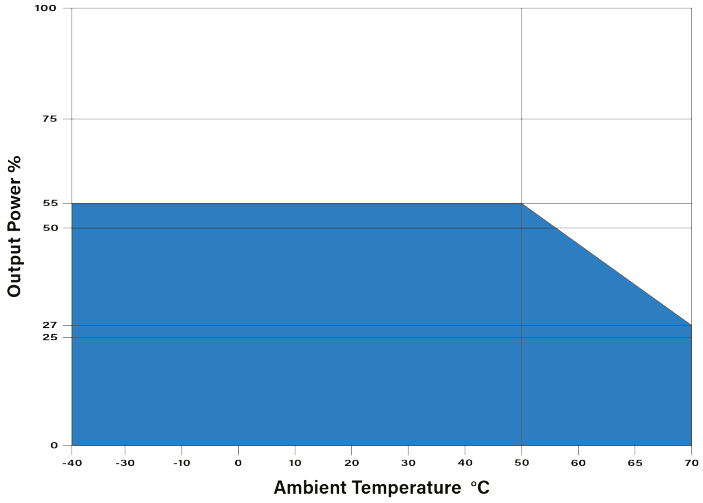
Temperature Derating, 12 VIN Convection Cooling



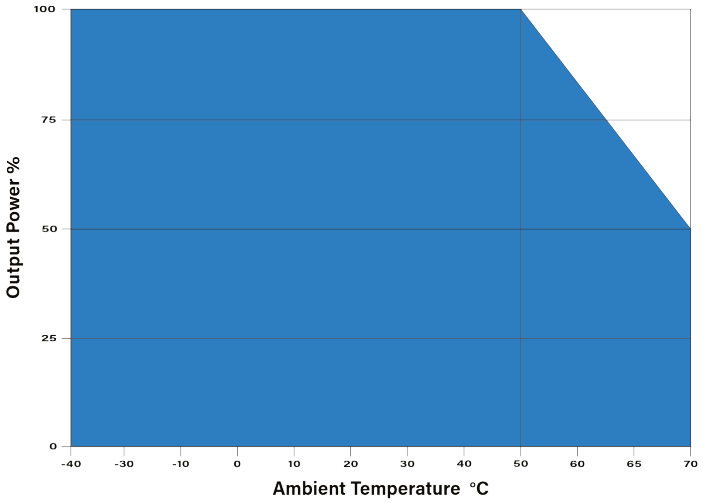
Temperature Derating, 12 VIN Forced Air (20.5 CFM)



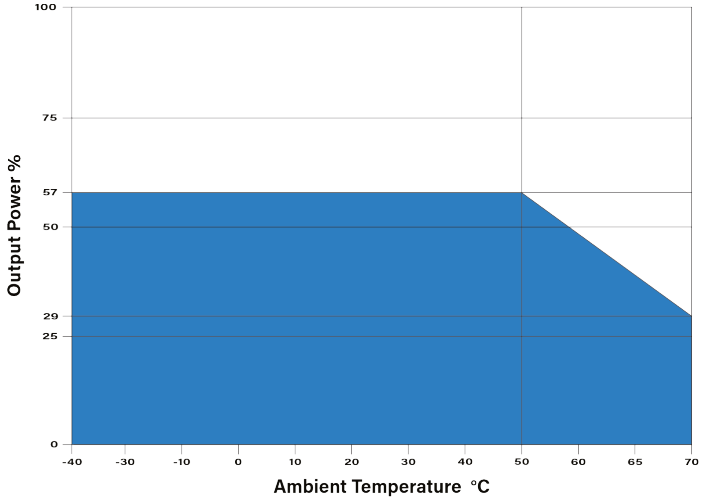
Temperature Derating, 15, 18, 19 VIN Convection Cooling



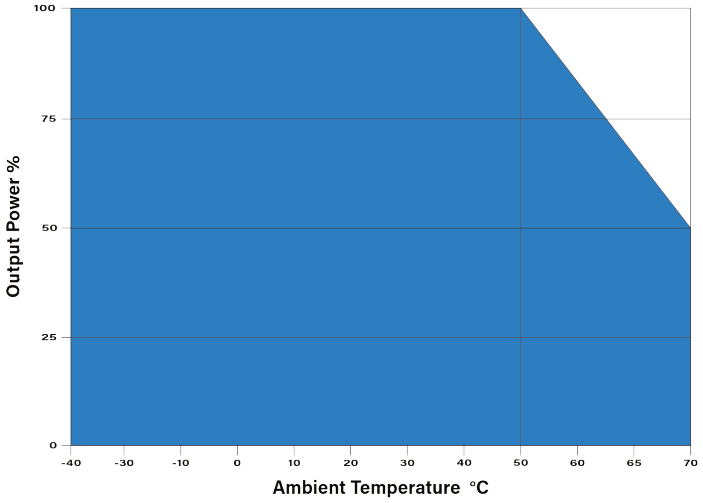
Temperature Derating, 15, 18, 19 VIN Forced Air



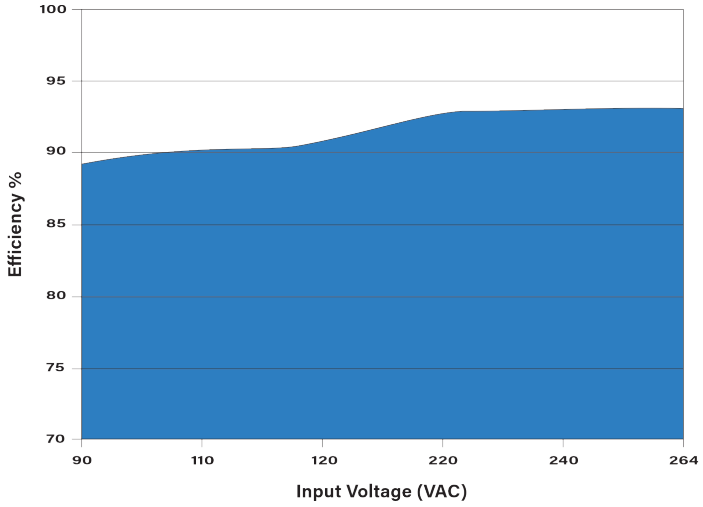
Temperature Derating, Other Models Convection Cooling



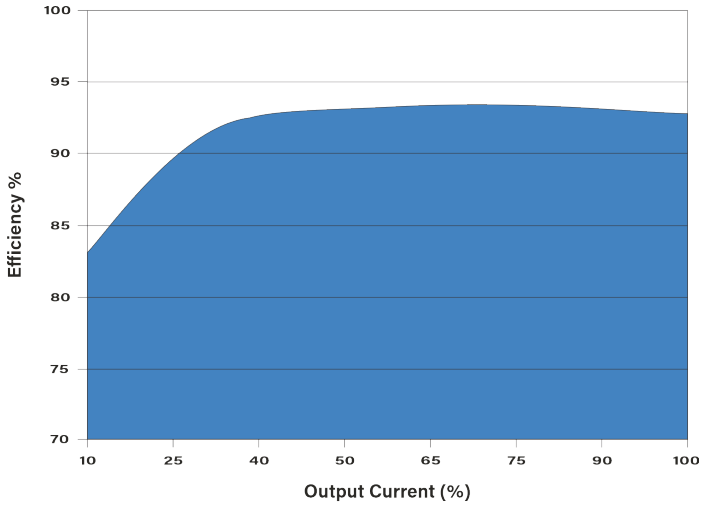
Temperature Derating, Other Models Forced Air



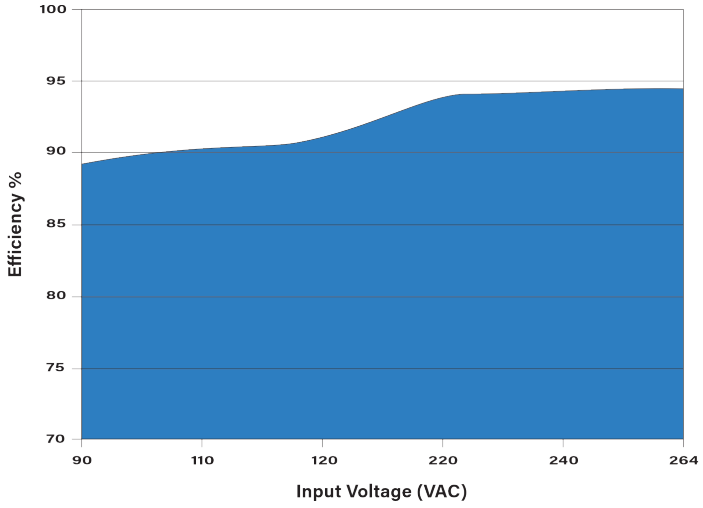
Efficiency vs Input Voltage: 12 VOUT



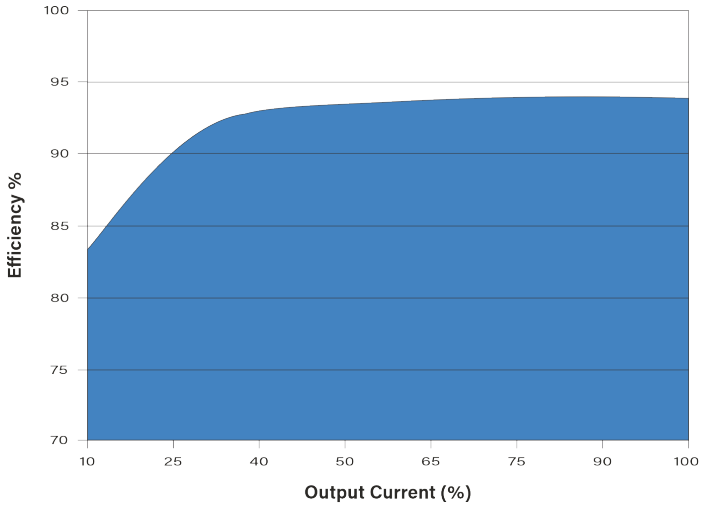
Efficiency vs Output Load: 12 VOUT



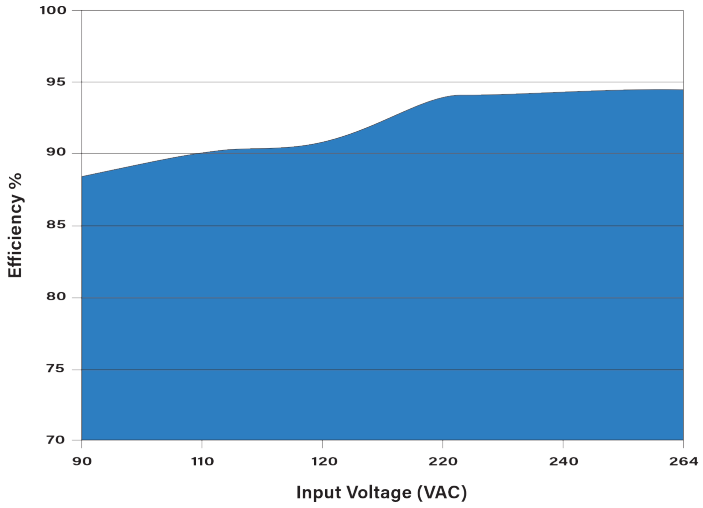
Efficiency vs Input Voltage: 24 VOUT



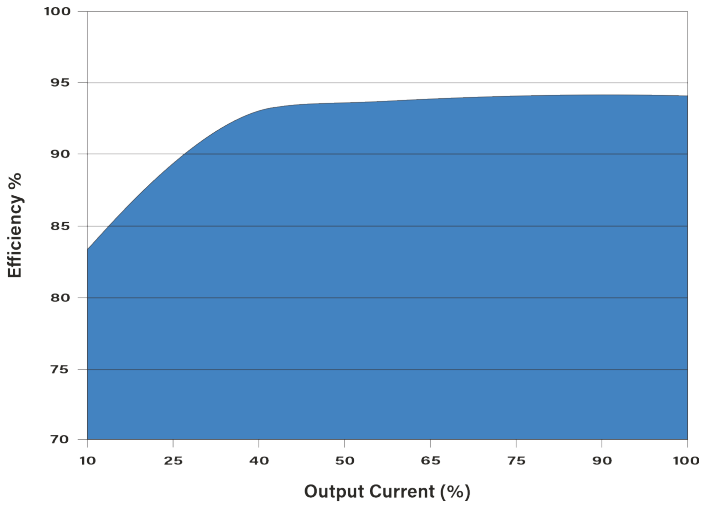
Efficiency vs Output Load: 24 VOUT



Efficiency vs Input Voltage: 48 VOUT

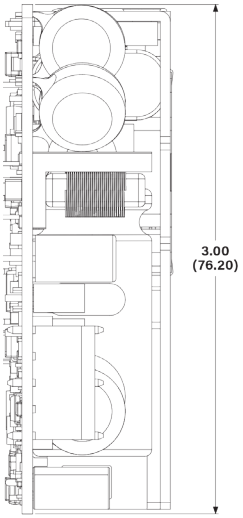


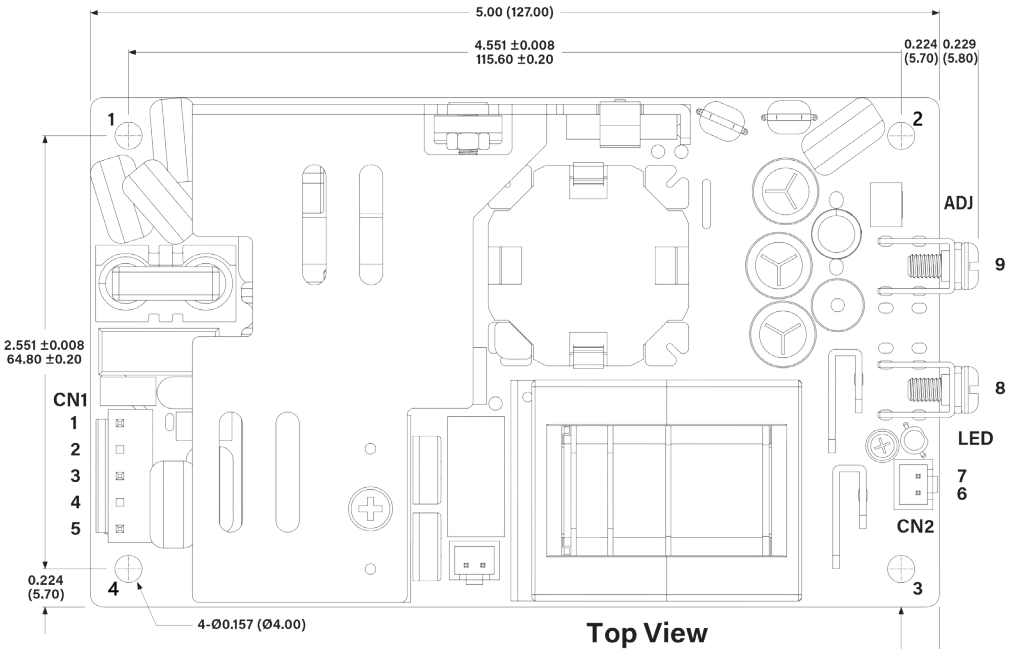
Efficiency vs Output Load: 48 VOUT



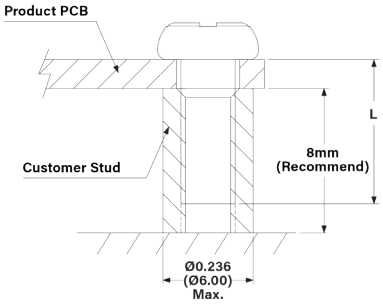
Mechanical Dimensions

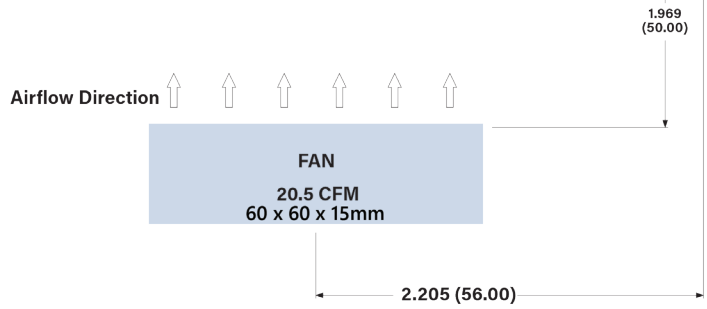
End View



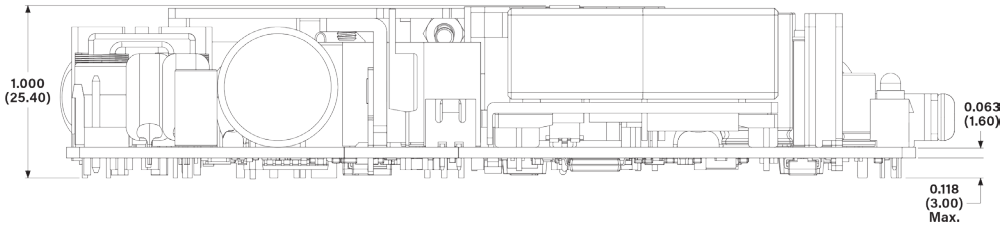


Top View





Side View



Connections

Input Connector (CN1):

- JST-B5P-VH or equivalent
- Mating Terminal: JST VHR or equivalent
- Contact: JST SVH-21T-P1.1

Pin	Function
1	AC-Neutral
2	No Connection
3	AC-Line
4	No Connection
5	Ground

Fan Connector (CN2):

- Kangdao 2.5XHS-2A or equivalent
- Mating Terminal: Kangdao 2.5XHS-2Y

Pin	Function
6	-Fan
7	+Fan

Output Connection:

- Screw Terminals

Pin	Function
8	-Vout
9	+Vout

Notes:

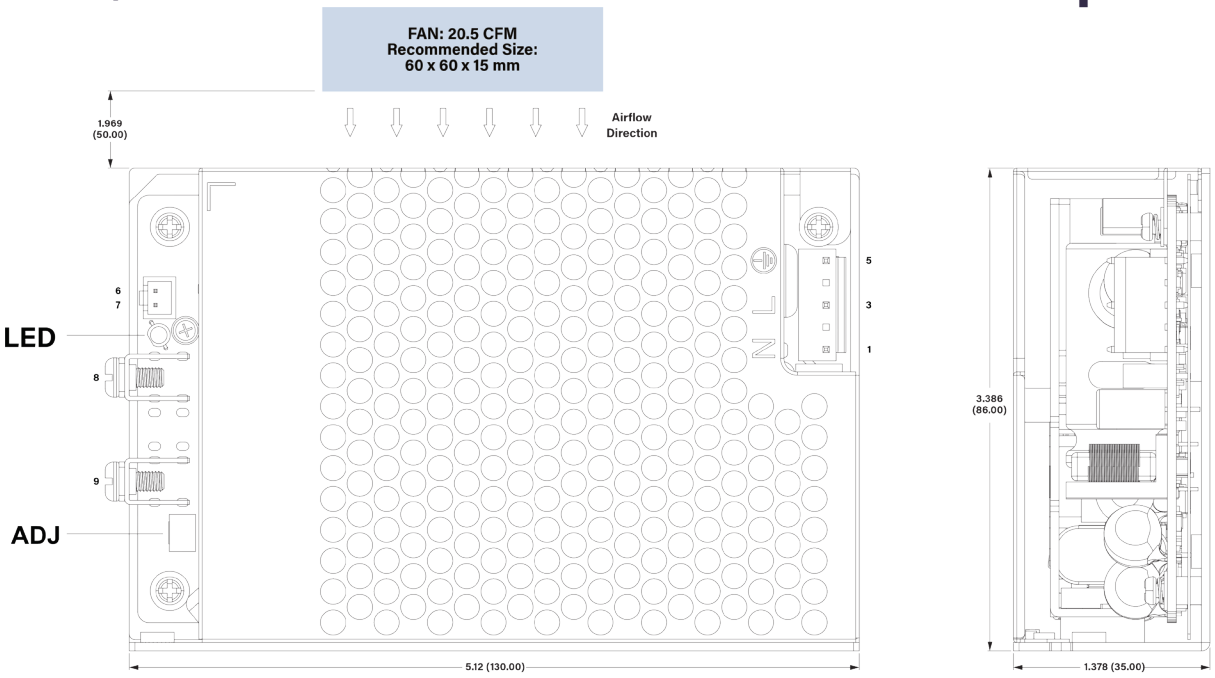
- All dimensions are typical in inches (mm)
- General Tolerance = ±0.039 (±1.0)
- Weight (Typ) = 10.4 Oz (295g)
- A minimum of 10 mm should be maintained between the power supply and any other components
- The unit uses double pole, neutral fusing. Disconnect the mains before servicing.
- ADJ: adjustable output resistor
- Connector tightening torque: M3.5, 0.8N ▪ m
- Wire range: 18-14AWG

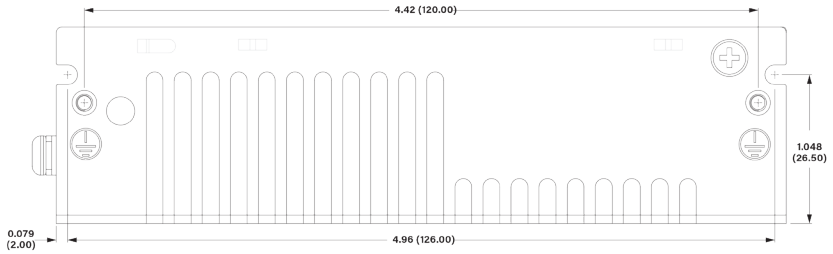
Unit Mounting Screws:

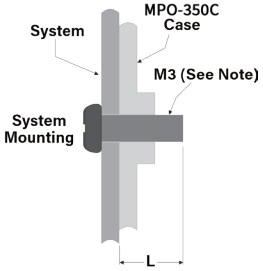
Position	Screw	Max L	Max Torque
1, 2, 3, 4	M3	6 mm	0.4N▪m

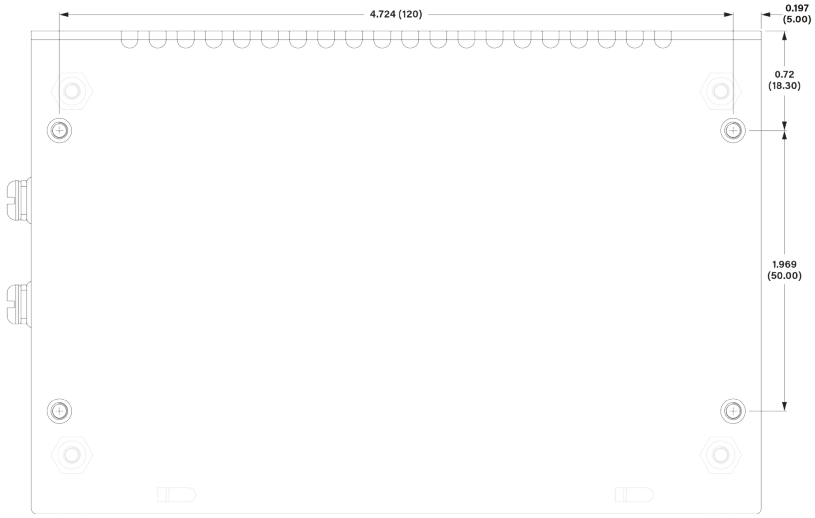
1. For class I systems, points 1, 2 & 4 must be connected to earth grnd.
2. For class II systems, points 1, 2 & 4 must be connected together

Case Option









Connections

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- JST-B5P-VH or equivalent
- Mating Terminal: JST VHR or equivalent
- Contact: JST SVH-21T-P1.1

Pin	Function
1	AC-Neutral
2	No Connection
3	AC-Line
4	No Connection
5	Ground

Fan Connector (CN2):

- Kangdao 2.5XHS-2A or equivalent
- Mating Terminal: Kangdao 2.5XHS-2Y

Pin	Function
6	-Fan
7	+Fan

Output Connection:

- Screw Terminals

Pin	Function
8	-Vout
9	+Vout

Notes:

- All dimensions are typical in inches (mm)
- General Tolerance = ±0.039 (±1.0)
- Weight (Typ) = 15.16 Oz (430g)
- A minimum of 10 mm should be maintained between the power supply and any other components
- The unit uses double pole, neutral fusing. Disconnect the mains before servicing.

Unit Mounting Screws:

Position	Screw	Max L	Max Torque
1, 2	M3	4 mm	0.4N•m
3, 4, 5, 6	M3	3 mm	0.4N•m

1. For class I systems, unit must be connected to earth grnd.
2. For class II systems, no connection to earth ground

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