

# 500 Watt EVD-F DC/DC CONVERTER



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## Description:



The 500 Watt EVD-F series is a ruggedized DC-DC converter suitable for electric vehicle, marine, industrial and other applications which draw power from a bank of batteries or other high voltage DC power source. It is used to supply power to accessories, lights, instruments, etc.

- Fully Isolated
- High Reliability
- High Efficiency
- Parallel Connection (up to 3x units)
- Over Voltage Protection
- Short Circuit Protection
- Over Temperature Protection
- Input Reverse Polarity Protection
- Enable/Remote On/Off
- Very Low Quiescent Current
- IP66 Enclosure
- RoHS Compliant
- 2 Year Warranty



## Model Selection

Model Number	Input Voltage Range	Input Current (Max)	Output Voltage (VDC)	Output Current (Max)	Efficiency
EVD-80-500-13F	50 - 120 VDC	11A	13.5	38A	93%
EVD-80-500-14F	50 - 120 VDC	11A	14.2	35A	93%

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## EVD-80-500-13F Specifications:

Input Parameters				
	Min	Typ	Max	Units
Input Voltage Range	50	72	120	VDC
Input Current @50VDC Input and Full Load			11	A
Input Current No Load Vin=50V, Io=0 Vin=120V, Io=0			100 90	mA
Input Current in Shut Down Mode (Quiescent Current)			30	μA

Input UVP/OVP				
	Min	Typ	Max	Units
Input UVLO, Turn off Io=0A Io=38A	44	46	48	VDC
Input UVLO, Turn on Io=0A Io=38A	46	48	50	VDC
Input OVLO, Turn off Io=0A Io=38A	122	124	126	VDC
Input OVLO, Turn on Io=0A Io=38A	120	122	124	VDC

Output Parameters				
	Min	Typ	Max	Units
Output Voltage Vin=72V, Io=0 - 38A	13.2	13.5	13.8	VDC
Output Current			38	A
Load Regulation Vin=72V, Io=0-38A			7	%
Line Regulation Vin=50V-120V, Io=38A			1	%
Ripple & Noise (20MHz) (3)		100	140	mV P-P
Overshoot/Undershoot			5	%
Load Transient Response 13.4V-14.2V, load step 10A- 19A, R/S: 0.1A/ μs			10	ms
Output Current Protection	42		48	A
Start Up Time @ 25°C, Full Load by Vin @ 25°C, Full Load by Enable			500 500	ms
Rise Time @ 25°C, Full Load			500	ms
Output Voltage Protection		15.6	16	V

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## EVD-80-500-14F Specifications:

Input Parameters				
	Min	Typ	Max	Units
Input Voltage Range	50	72	120	VDC
Input Current @50VDC Input and Full Load			11	A
Input Current No Load Vin=50V, Io=0 Vin=120V, Io=0			100 90	mA
Input Current in Shut Down Mode (Quiescent Current)			30	μA

Input UVP/OVP				
	Min	Typ	Max	Units
Input UVLO, Turn off Io=0A Io=35A	44	46	48	VDC
Input UVLO, Turn on Io=0A Io=35A	46	48	50	VDC
Input OVLO, Turn off Io=0A Io=35A	122	124	126	VDC
Input OVLO, Turn on Io=0A Io=35A	120	122	124	VDC

Output Parameters				
	Min	Typ	Max	Units
Output Voltage Vin=72V, Io=0 - 35A	13.8	14.2	14.6	VDC
Output Current			35	A
Load Regulation Vin=72V, Io=0-35A			7	%
Line Regulation Vin=50V-120V, Io=35A			1	%
Ripple & Noise (20MHz) (3)		100	140	mV P-P
Overshoot/Undershoot			5	%
Load Transient Response 13.9V-14.1V, load step 10A- 19A, R/S: 0.1A/ μs			10	ms
Output Current Protection	39		45	A
Start Up Time @ 25°C, Full Load by Vin @ 25°C, Full Load by Enable			500 500	ms
Rise Time @ 25°C, Full Load			500	ms
Output Voltage Protection		15.6	16	V

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## Specifications:

Remote On/Off	
Converter On	Enable (ON/OFF) Connected to +VIN. * Activates from 3 to 6 VDC, referenced to -VIN up to +VIN MAX.

General Specification				
	Min	Typ	Max	Units
Capacitive Load			5000	µF
Isolation Voltages 60 Seconds Input to Output Output to Case	1500 500			VAC
Isolation Resistance 500VDC	10			Mohms
Operating Temperature (Ambient)	-40		+75	°C
Storage Temperature	-40		+85	°C
Baseplate Temperature (Maximum)			+95	°C
Humidity	0		90	%
MTBF MIL-HDBK-217F @ 25°C Ground Benign	150			kHours
Cooling	Baseplate temperature cannot exceed specified maximum, under all operating conditions in application.			
Case Size	7.48 x 2.99 x 1.71 inches 190.0 x 76.0 x 43.5 mm			
Case Material	Metal			
Weight	1.25 kg			
Agency Approvals:	Designed to meet IEC, UL, CSA			

### Notes:

- (1) All specifications are stated at 25°C ambient and typical input line.
- (2) Ingress protection to IP66, excluding connectors.
- (3) Output terminated with 10µF aluminum capacitor and 0.1µF MLCC.
- (4) Factory Set-point is Typical Voltage on table, +-1.5% @ half load.
- (5) Vibration to withstand 8G in x,y and z axis from 0 to 200Hz for 1 minute.
- (6) Units are not designed to be hot-swapped. Hot swapping units while energized will cause damage.
- (7) Specification is subject to change without notice.
- (8) See Green Watt Power website for RoHS statement. [www.greenwattpower.com/pdf/rohs.pdf](http://www.greenwattpower.com/pdf/rohs.pdf)

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## Application Notes:

### Over Voltage Protection:

The power converter includes an internal output over voltage protection (OVP) circuit, which monitors the voltage on the output terminals. If this voltage exceeds the OVP set point, the converter will shut down and then restart after a fixed delay time (hiccup mode).

### Over Temperature Protection:

The over-temperature protection consists of circuitry that provides protection from thermal damage. If the temperature exceeds the preset temperature threshold, the converter will shut down, and all components will not exceed their absolute maximum temperature ratings. The converter will restart after the baseplate temperature is below 85°C.

### Output Over-Current Limit and Short Circuit Protection:

The converters include internal over-current protection (OCP) and short circuit protection (SCP) circuits. The response of the SCP circuit is much faster than that of the OCP circuit. Slow increase of the output current will let the converter enter OCP protection when the current exceeds the OCP set point, while the fast increase of the output current will let the converter enter SCP when the currents exceeds the SCP set point.

Both OCP and SCP protection are hiccup mode designed. The output voltage will soft start to set point when the overload condition or short circuit condition is removed.

Note: The converter can charge Aux. battery attached on the output with a constant current of 38A typical from 9V to 13.8V. Care should be taken if the Aux. battery nominal sink current is less than 38A. For this condition, an additional charging circuit should be added on the system side.

### Input Reverse Voltage Protection:

The reverse standoff voltage shall be no more than -120VDC.

### Remote On/Off:

The converter has Enable control function. This Enable Pin is designed on the input side of the converter, the converter will turn on when the applied voltage is greater than 6V refer to the VIN-, and turn off when the Enable PIN connected to VIN- or floating. A direct method to turn the converter on is connecting the Enable Pin to VIN+.

### Thermal Condition:

The converter should be mounted on a base plate with thermal grease, and the maximum base plate temperature is suggested to be controlled to within 85°C.

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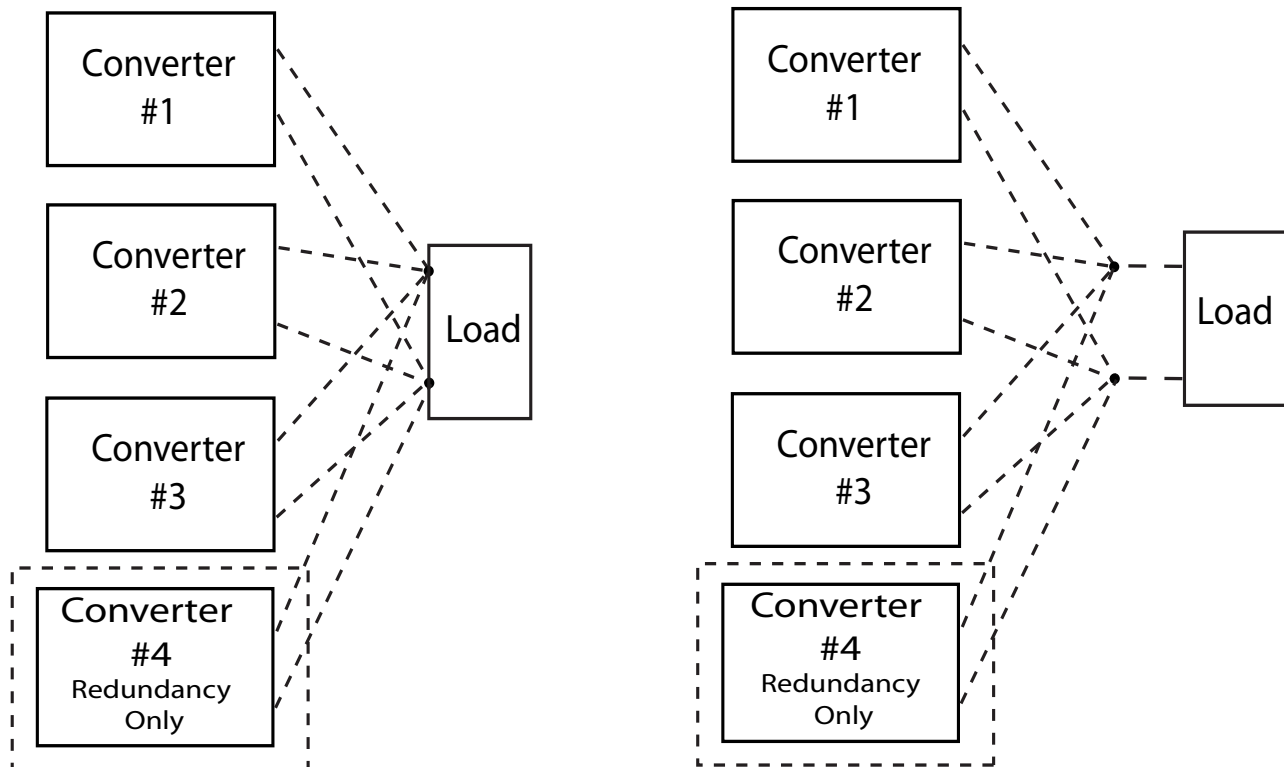
## Recommended Parallel Connections

The EVD converters can be connected in parallel in the following configurations.

The impedance of the cables connecting the units should be within  $\pm 5\%$  of each other.

During parallel operation all converters should be energized and de-energized together to prevent abnormal operation or damage from improper operation.

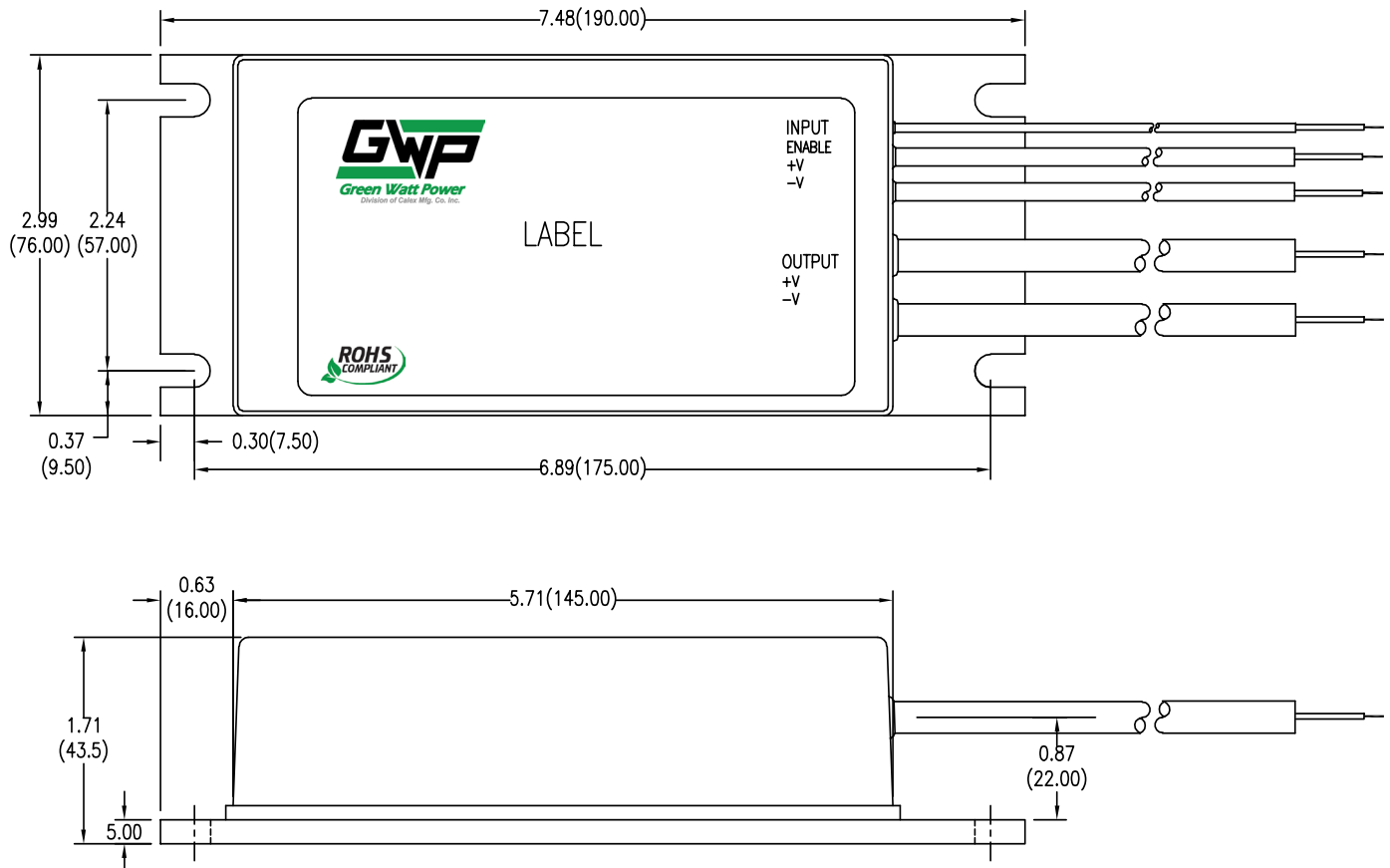
The converters can support 1500W with three converters paralleling. The converter is also suitable for redundant operation, the output power can support 1000W with three converters paralleling and 1500W with four converters paralleling.



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## Case Specifications



All dimensions are inches (mm)  
Tolerance  $\pm 0.01$  (0.254) unless otherwise noted

**\* Notes:**

1. Output is enabled when enable wire 3 to 6VDC or higher referenced to the  $-V_{IN}$  wire. If enable feature is not required enable wire should be connected to  $+V_{IN}$  wire.

INPUT	FUNCTION	COLOR
1	V+	BROWN
2	V-	BLUE
3	ENABLE	YELLOW

OUTPUT	FUNCTION	COLOR
1	V+	RED
2	V-	BLACK