

# 120 Watt Factory Programmable Electric Vehicle Charger



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## Description

The EVC-AA-120-XXYYYY is a 120 Watt, constant power, factory programmable charger for use in charging Lithium Ion and other chemistry battery systems used in Electric Vehicles. The charger can be programmed to the customer's current/voltage requirements up to 120 Watts of power. See table below for available ranges.

- Universal AC Input / Full Range
- 90 - 305 VAC Input
- High Reliability
- Efficiency up to 89%
- Power Factor up to .98 min @ 110 VAC Full Load
- Over Voltage Protection
- Short Circuit Protection
- Over Temperature Protection
- Open Circuit Protection
- Waterproof IP67 Enclosure
- RoHS Compliant
- 2 Year Warranty



## Model Selection

Model Number	Programmable Output Charging Current Range	Voltage Range
EVC-24-120-XXYYYY*	3800 mA to 4200 mA	15 V - 30 V
EVC-36-120-XXYYYY*	2527 mA to 2793 mA	22.5 V - 45 V
EVC-48-120-XXYYYY*	1938 mA to 2142 mA	29 V - 58.8 V

\*XXYYYY specifies nominal programmable Voltage (XX) based on the nominal output charging current (YYYY).

See Page 6 of Specification for defining your custom part number.

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## Specifications

Input Parameters			
Input Voltage Range* *Designed to optimum performance at 110 and 230 nominal lines	MIN TYP MAX	90 110 305	VAC
Input Frequency	TYP	47 - 63	Hz
Power Factor 110 VAC Input, Full Load 230 VAC Input, Full Load	MIN	0.98 0.95	
Input Current 110 VAC, Continuous 230 VAC, Continuous	MAX	1.5 0.75	A <sub>RMS</sub>
Efficiency 115VAC Full Load 230VAC Full Load	TYP TYP	86 89	%

48V Output Parameters			
48V Charging Current Setting Range	MIN TYP MAX	1938 2040 2142	mA
48V Charging Voltage Range	MIN MAX	29 58.8	V
The output charging current can be programmed between 1938mA and 2142mA, while the maximum output voltage increases up to 58.8V accordingly based on the principle of 120W maximum output power.			
Output Overshoot/Undershoot (Power On/OFF) Overshoot (output peak current) 5.6A maximum @ nominal AC input, full load, 25 °C. Measured with 20MHz bandwidth.			

24V Output Parameters			
24V Charging Current Setting Range	MIN TYP MAX	3800 4000 4200	mA
24V Charging Voltage Range	MIN MAX	15 30	V
The output charging current can be programmed between 3800mA and 4200mA, while the maximum output voltage increases up to 30V accordingly based on the principle of 120W maximum output power.			
Output Overshoot/Undershoot (Power On/OFF) Overshoot (output peak current) 5.6A maximum @ nominal AC input, full load, 25 °C. Measured with 20MHz bandwidth.			

All Models			
Current Accuracy	MAX	±5	%
Voltage Accuracy	MAX	±2	%
Output Power	MAX	120	W
Ripple and Noise - I <sub>out</sub> with typical CV load at 25°C 100-240VAC input measured at 20 MHz bandwidth	MAX	20	% I <sub>out</sub>
Turn-on Delay Time Full Load @ 110 VAC Full Load @ 230 VAC	MAX	2	s
Rise Time @ 25°C, Full Load	MAX	150	mS
Current Temperature Coefficient 0 °C < T <sub>case</sub> < T <sub>cmx</sub>	MAX	0.05	% / °C
Voltage Temperature Coefficient 0 °C < T <sub>case</sub> < T <sub>cmx</sub>	MAX	0.05	% / °C

36V Output Parameters			
36V Charging Current Setting Range	MIN TYP MAX	2527 2660 2793	mA
36V Charging Voltage Range	MIN MAX	22.5 45	V
The output charging current can be programmed between 2527mA and 2793mA, while the maximum output voltage increases up to 30V accordingly based on the principle of 120W maximum output power.			
Output Overshoot/Undershoot (Power On/OFF) Overshoot (output peak current) 5.6A maximum @ nominal AC input, full load, 25 °C. Measured with 20MHz bandwidth.			

Isolation Test: Primary to Secondary	3750 VAC 10 mA Max/60 seconds (3 seconds for production)		
Isolation Test: Primary to Ground	1875VAC 10 mA Max/60 seconds (3 seconds for production)		
Isolation Test: Secondary to Ground	500VAC 10 mA Max/60 seconds (3 seconds for production)		
Leakage Current: @240VAC/50Hz	0.50mA Max		
Ground Resistance: @ 25A, 1 minute	MAX	0.1	Ω
Isolation Resistance: Primary to Secondary with 500 VDC test voltage	MIN	100	MΩ

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MTBF: (MIL-HDBK-217F 25°C, 230VAC input and full load output)	≥ 200,000	Hours
Life Time: @ 50°C, 230 VAC input and full load output	≥ 50,000	Hours
Temperature - Operating	MIN MAX	-20 +60 °C
Temperature - Storage	MIN MAX	-40 +85 °C
Relative Humidity	10% - 100%	
Weatherproof	IP64 for Enclosure	
Case Size	10.75" x 1.93" x 1.59" 273mm x 49mm x 40.5mm	
Unit Weight	0.8 kg	
Agency Approval	Designed to meet CE and UL1012	

#### Notes:

- (1) When the output voltage is less than set maximum voltage, charger will be in CC mode. When the output voltage reaches and is above  $\pm 2\%$  of the set maximum voltage, the charger will be in CV mode.
- (2) Vibration - 10 to 300 Hz sweep at a constant acceleration of 1.0G (Breadth: 3.5mm) for 1 hour for each of the perpendicular axes X, Y, Z.
- (3) Specifications are subject to change without notice.
- (4) See Green Watt Power website for RoHS statement. [www.greenwattpower.com/pdf/rohs.pdf](http://www.greenwattpower.com/pdf/rohs.pdf)

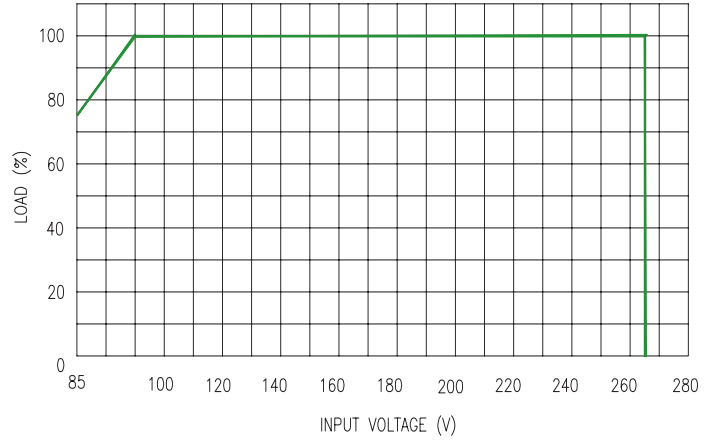
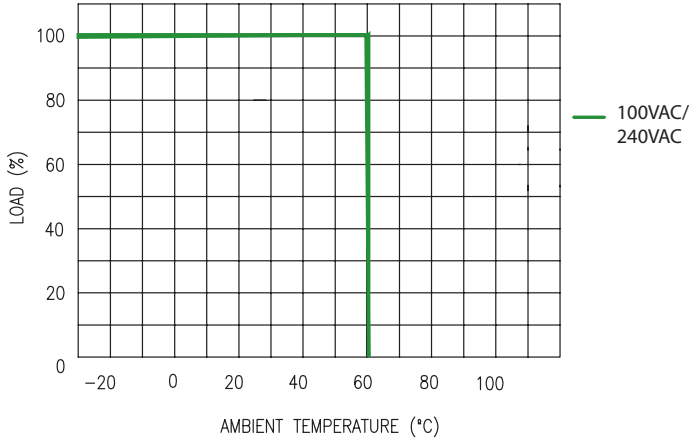
Protection	
Short Circuit Protection	Auto-Recovery - return to normal when fault condition is removed
Over Voltage Protection	Can be programmed at 3-5V over maximum voltage output. Auto-recovery during over voltage protection and will return to normal operation when fault condition is removed.
Over Temperature Protection	The unit will go into thermal protection when it is overheating. The unit will enter auto-recovery mode and will self-recover when the temperature becomes normal.
Open Circuit Protection	When output is open, power supply will enter auto-recovery and return to normal operation after fault condition is removed.

Electromagnetic Compatibility EMI/EMC	
EMI	Comply with EN55002 Class B
Immunity:	
EN61000-3-2	Harmonic Current Emission
EN61000-3-3	Voltage Fluctuations and Flicker
EN61000-4-2	ESD 8kV Air Discharge, 4kV Contact Discharge, Criteria A
EN61000-4-3	Radio-frequency Electromagnetic Field Susceptibility Test-Rs Level 3, Criteria A
EN61000-4-4	Electrical Fast Transient/Burst -EFT 4KV, Criteria A
EN61000-4-5	Surge Immunity Test, AC power line: Line to Line 2kV, Line to Earth 4kV, Criteria B
EN61000-4-6	Conducted Radio Frequency Disturbance Test-Cs, Level 3 Criteria A.
EN61000-4-8	Power Frequency Magnetic Field Test 3A/m, Criteria A
EN61000-4-11	Voltage Dips, Criteria B

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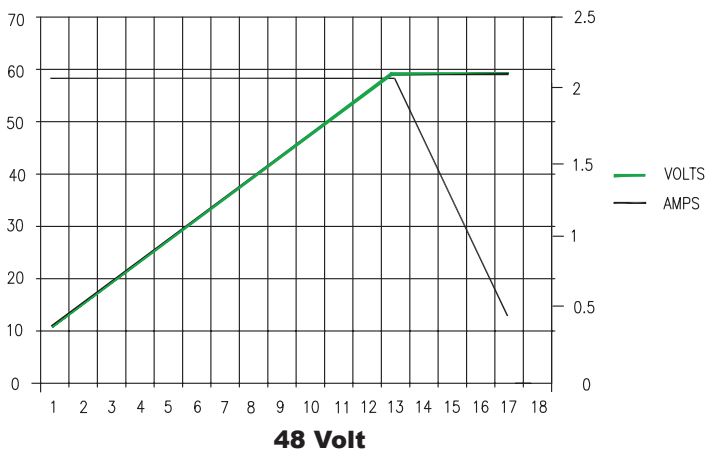
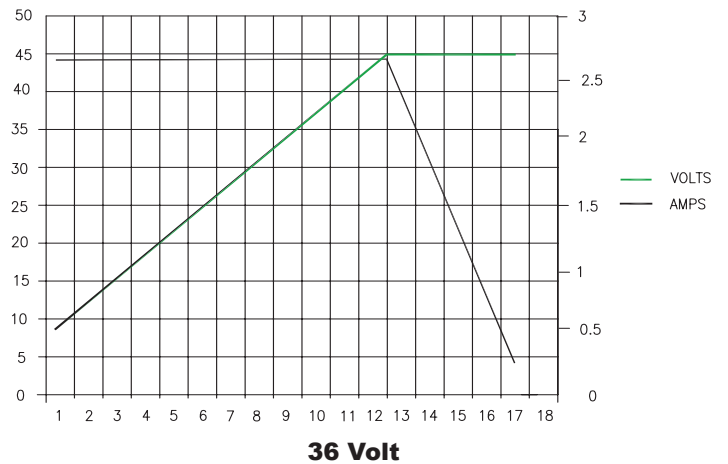
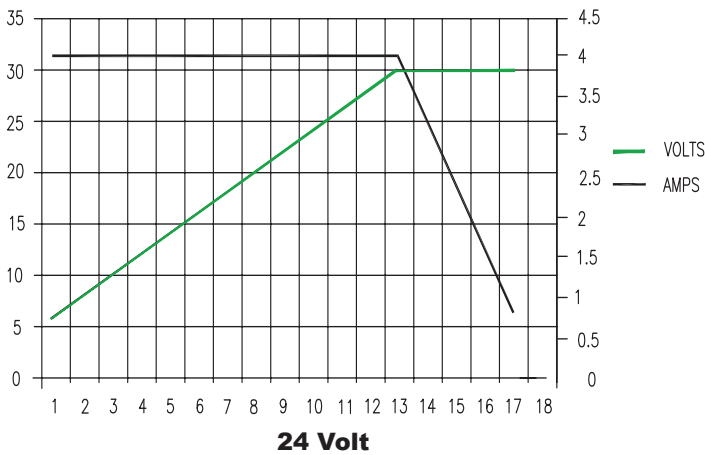


## Derating Curve



## Charging Curve

Charging curves are defined at maximum voltage and current.

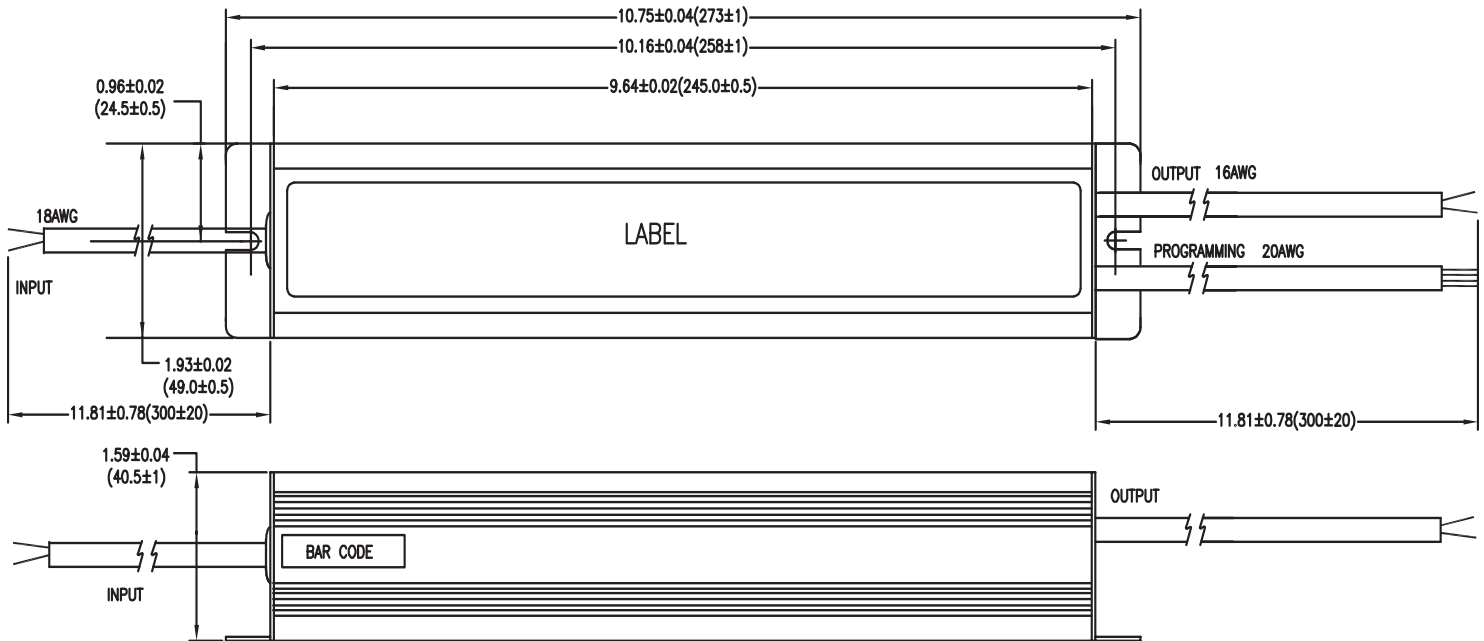


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## Case Specifications

All dimensions are inches (mm)



Wiring Table			
	Color	Function	
Input	Blue	Neutral	
	Brown	Line	
	Gr/Y	Ground	
Output	Black	Vo-	
	Red	Vo+	
Programming	Orange +	Programming	Red LED (see below)
	White -		
	Grey +	Programming	Green LED (see below)
	Purple -		

**NOTE:**

4-Wire programming/indication cable is for programming the charging profile. After programming, it can be used for the indication of 2 charge status LEDs. First LED in Red (if connected on customer's application) will show the charger is charging in the CC and will continue to stay on as the charger goes into the final CV charge mode. The second LED in Green (if connected on customer's application) will come on when the charge is complete is defined at the <50mA being absorbed by the battery state.

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## Custom Programmed Parameter Worksheet

To determine your custom programmed part number please fill in the questions below and forward to [sales@greenwattpower.com](mailto:sales@greenwattpower.com)

Model Number Structure EVC-AA-120-XXYYY

1. (AA) Pick Base 120W Model:  24V       36V       48V
2. (XX) Define desired voltage for charger where Constant Voltage (CV) state should take place: \_\_\_\_\_ Volts.
3. (YYYY) Define desired current for charger to be in Constant Current (CC) state, until Constant Voltage (CV) state voltage is reached: \_\_\_\_\_ mA

Model Part Number will be :EVC-AA-XXYYY from above selection.

Charge curve for this specific charger can be provided by the factory once the above parameters have been defined.

**Note: All other standard tolerances shown in the previous pages of the datasheet shall apply.**