600 Watt Electric Vehicle Li-Ion Charger Data Sheet

Description:

The 600W Li-Ion battery chargers are designed with ultra-high efficiency, as well as full metal case enclosure. The extraordinary performances of low power dissipation and water proof capability provide the chargers high reliability and long lifetime. This series of chargers offer solid and safe power conversions for applications such as e-vehicles, e-bikes, e-motorcycles, e-boat, e-machines, etc.

Features:

- Universal AC Input Voltage: 90~264Vac
- High Reliability
- Communications via CAN bus
- Efficiency up to 94%
- All-Around Protections: OVP, OCP, SCP, OTP, RCP
- Timer Off Function
- Auto Off @ No Load
- Low Temperature Start Up @ -20°C
- High Temperature Full Load Operation @ 45°C
- IP65 Ingress Grade
- Dimension: 8.2x4.3x3.0” (209x110x75mm)

Model Number	Output Voltage Range (Typ)	Output Current	Current Range	Wattage	IP Rating	Communication
EVC-55-600-FC (PLD600-EVC-48)	36~54.6V (48)	11A	95~105%Io	617W	IP65	CAN
EVC-71-600-FC (PLD600-EVC-60)	43~71.4V (60)	8.3A	95~105%Io	621W	IP65	CAN
EVC-84-600-FC (PLD600-EVC-72)	53~84V (72)	7.2A	95~105%Io	630W	IP65	CAN

Note: Model numbers in parenthesis are factory numbers

Specifications:

Input Parameters (All Models)

	Min	Typ	Max	Units
Input Voltage Range	90	115/230	264	VAC
Input Frequency	47	50/60	63	Hz
Power Factor 115Vac, 80%Full Load 230Vac, 80%Full Load	 0.98 0.96	 0.99 0.97		
Input Current (Under 115Vac input & Full load)			6	A
Efficiency 115Vac, Full Load 230Vac, Full Load	 91 93	 92 94		%
AC Under Voltage Protection Brown-in voltage (charger off-> charger on) Brown-out voltage (charger on-> charger off) (If there is an interruption in AC power, the charger will resume charging when proper AC power is restored.)		 86 ±3 76 ±3		VAC

Output Parameters

Voltage Range	36~54.6V (48 typ.)	43~71.4V (60 typ.)	53~84V (72 typ.)
Output Power (Watts) Min Typ Max	 385 528 617	 348.3 504 621.2	 365.7 518.4 630
Output Current (Amps) Min Typ Max	 10.7 11.0 11.3	 8.1 8.4 8.7	 6.9 7.2 7.5
DC Over Voltage Protection Charger enters auto recovery mode when the output voltage is between	56V~63V	75V~80V	88V~92V
Battery Under Voltage Protection Charger shall not output if the sensed battery voltage is lower than:	35±1V	40±2V	50±2V
Current Ripple & Noise 25°C – 20MHz bandwidth. Measurement with 20MHz bandwidth oscilloscope. (Rated input & output.)	±15% Iout nom	±15% Iout nom	±15% Iout nom
Turn-on Delay Time (Full Load)	3 seconds	3 seconds	3 seconds

General			
Communication Protocol	The charger is designed with CANOpen communication. The CAN bus should be isolated and with a 120 Ohm terminating resistor. The communication protocol can be defined as required by the customer.		
Display LED's / User interface The charger is designed with LED indicators on the DC output side panel. The charger state will be indicated as:	RED: Charging: GREEN: Charge complete FLASHING RED: Error OFF: No AC input or AC under voltage		
Temperature* (Operating ambient)	MIN MAX	-20 50	ºC
Temperature (Storage)	MIN MAX	--25 +85	ºC
Relative Humidity (Operating) Relative Humidity (Storage)	10% RH to 90% RH, No condensation. 5% RH to 95%RH. No condensation.		
Weatherproof	IP65 (except the connectors and fan).		
Case Size	8.23" x 4.33" x 2.95" 209x110x75mm		
Unit Weight	2.7kg		
MTBF	>100,000 hours at 45°C, Full load and nominal input condition. The lifetime shall be >50,000 hours at 25°C ambient, full load and nominal input condition.		
Vibration	In 3 axes sinusoidal 3.5 mm /1-1.5 g/2-9-200-500Hz/1okt/min/3*10 sweeps; rectifier packed. (according to ETSI EN 300 019-1-2 class 2.3 transport).		

* The charger is forced air cooled and the fan is located on the top of the charger metal case. The fan is not speed adjustable once powered, the fan can operate. The fan will be triggered when the case temperature is between 40 - 50ºC. The Charger's case temp hot spot point is 70ºC max and 60ºC max at plastic handle for user holding and carrying off-board charger. If the case temperature is greater than 70ºC, the output power will be suitably de-rated to reduce the case temperature, and if the temperature keeps going up, then OTP shall be triggered. The temperature rise when the charger is under operation at high temperatures shall be less than 20ºC.

Protections (All Models)	
Short Circuit Protection (SCP)	Hiccup Mode Charger will self-recover when fault is removed
Over Voltage Protection (OVP)	Enters Auto recovery mode when output voltage is between 127.8 and 162.7V. The unit will return to normal operation when powered back on.
Over Temperature Protection (OTP)	The charger shall enter into OTP when temp is 70~80C with hiccup mode and will resume charging, when safe internal temperature is restored.
Communication Fault Protection	When there is a communication fault between charger and BMS, the charger will not output. The charger and can self-recover via CANOpen commands.
Anti-Reverse Polarity Protection	When the battery polarity is reversely connected to the charger, the charger will not output.

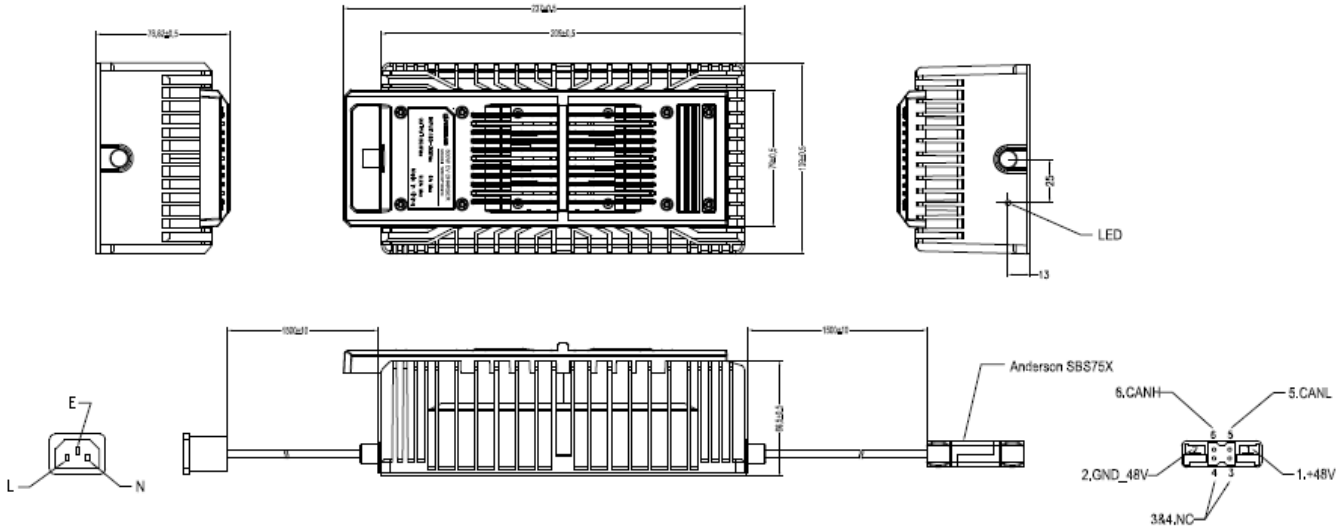
Regulatory	
Agency Approval	Designed to meet UL1564 and CE (certification by safety agency will separately be required)
Dielectric Strength (Hi-pot) Production test is 3 seconds	Primary to Secondary: 3000Vac / 10mAMax / 60seconds Primary to Earth: 1500Vac 10mA max./60 seconds Secondary to Earth: 500Vac 10mA max./60 seconds
Leakage Current	0.75mA max. @230Vac / 50Hz
Insulation Resistance	100Mohm min. @primary to secondary applying 500Vdc test voltage
Grounded Resistance	0.1Ω max. @ 25A, 1 minute.

Electromagnetic Compatibility EMI/EMC	
EMI, RFI	Comply with EN55032 CLASS B
Immunity:	
EN61000-3-2	Class A: Harmonic current emission
EN61000-3-3	Voltage Fluctuations and Flicker
EN61000-4-2	ESD 8kV Air Discharge, 4kV Contact Discharge, Criteria A
CISPR 16-2-1:	Radio-frequency Electromagnetic Field Susceptibility Test, 20~2000MHz, 30V/m
EN61000-4-4	Electrical Fast Transient/Burst – EFD, 5/50ns / 5kHz / direct coupling 2kV, Criteria A
EN61000-4-5	Surge Immunity Test, AC power line: line to line 2kV, line to each 4kV Criteria A
EN61000-4-6	Conducted Radio Frequency Disturbance Test-Cs, 0.15-80MHz / 1kHz / 80% AM/3V, Criteria A
EN61000-4-11	Voltage Dips, -95%/10ms, performance B

Notes: Specification is subject to change without notice.

MECHANICAL

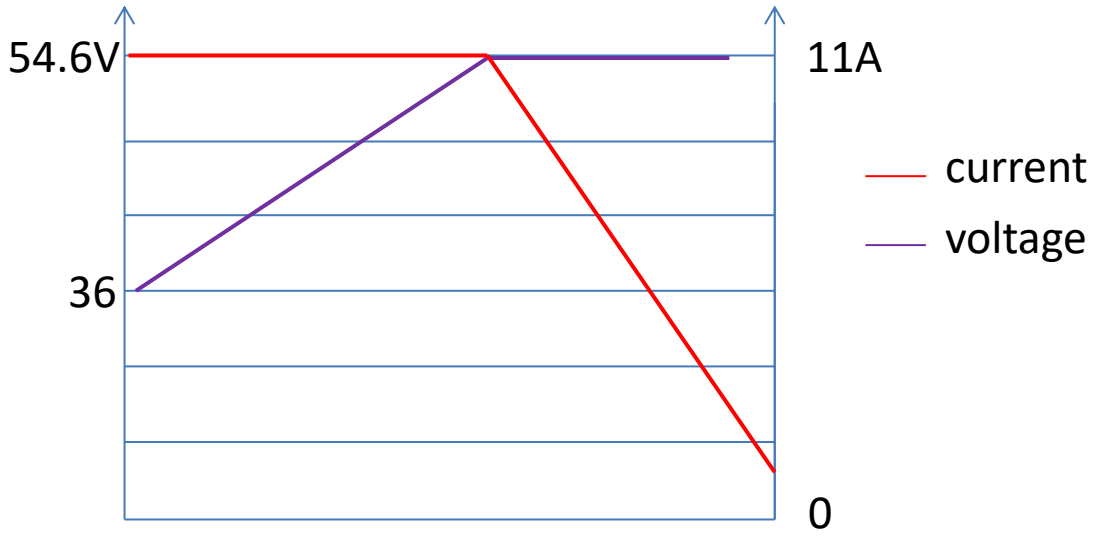
Dimension and Outline Drawing



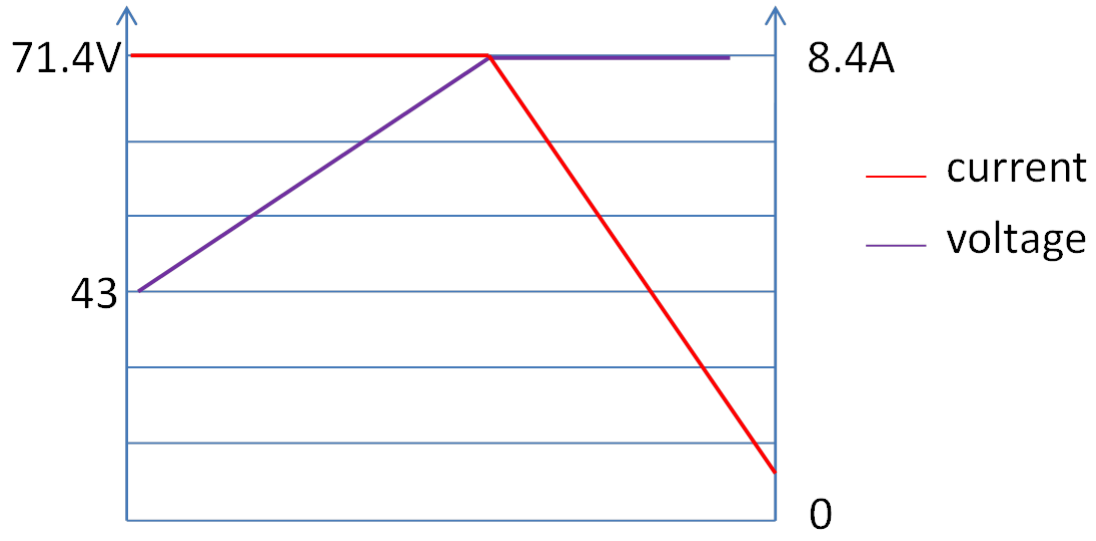
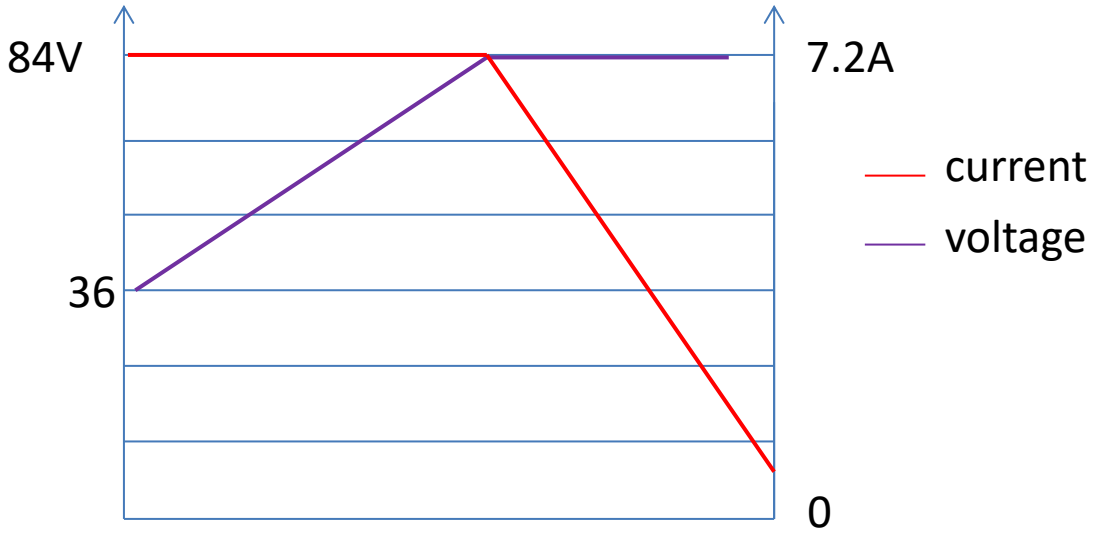
Charge Curves

Note: the cut off current when almost fully charged is within 200~600mA and the charger will stop charging

48V Typical



60V Typical



72V Typical