

700 Watt Opal Series Electric Vehicle Li-Ion Charger Data Sheet

Description:

The 700W Li-Ion battery charger Opal Series 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
- Communications via CAN bus
- Typical efficiency 92%
- Timer Off Function
- Automatic shutdown of output at no load
- Charge function Indicator
- IP65 Ingress Grade
- Dimension: 8.2x4.3x3.1" (209x109x78mm)
- All-Around Protections: Lightning Protection, AC Brown-out, DC UVP, OVP, SCP, RPP, OTP

Model Number	Output Voltage Range (Typ)	Output Current	Wattage	IP Rating	Communication
EVC-59-700-FC (PLD700-EVAS08-05812SB)	30.0~58.8	12A	700W	IP65	CAN

Note: Model numbers in parenthesis are factory numbers

Specifications:

Input Parameters				
	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	0.97	0.98		
230Vac, 80%Full Load	0.96	0.97		
Input Current				
115Vac input & Full load @ 25°C			8	A
230Vac input & full load @ 25°C			4	A
Efficiency				
115Vac, Full Load	88	89		%
230Vac, Full Load	91	92		

Output Parameters	
Voltage Range (Vdc)	30.0~58.8
Output no-load voltage (Vdc)	58.4~59.2
Output Power (Watts)	700
Output Current (Amps)	
Min	11.6A
Typ	12.0A
Max	12.4A
IP Grade (except the connectors, IP55 for Fan)	IP65
Operating Temperature*	-20°C to +50°C
Storage Temperature	-15°C to +85°C
Operating Humidity	10% RH to 85% RH
Storage Humidity	5% RH to 95% RH
Current Ripple & Noise [25°C – 20MHz bandwidth. Measurement with 20MHz bandwidth oscilloscope.] (Rated input & output.)	±15% lout max
Turn-on Delay Time (Full Load)	3 seconds

* 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 to 50°C. The Charger's case temp hot spot point is 70°C max and 60°C max at plastic handle for user holding and carrying off-board charger. If the case temperature is greater than 70°C, 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 20°C.

Protections	
Short Circuit Protection (SCP)	When the output is short circuited, the power supply will not be damaged and will enter the latch mode. After the fault is eliminated, plug and unplug AC again to recover
Output Over Current Protection (OCP)	When the output current exceeds 13±0.5A and lasts for more than 2S, the output overcurrent protection is triggered. When the fault is removed, the AC can be restored
DC Over Voltage Protection (Software)	63V Max. Charger enters auto recovery mode when the output voltage is exceeded
Battery Under Voltage Protection	30± 1V Charger enters latch mode and shall not output if the sensed battery voltage is lower than:
AC Line Brownout/AC Under Voltage Protection	The charger shall not be damaged when the input is below 90Vac. (If there is an interruption in AC power, the charger will resume charging when proper AC power is restored.)
Over Temperature Protection (OTP)	When the power supply enters the overheat protection state (shell temperature exceeds 65 ± 5°C), no parts are damaged; When the shell temperature drops to 55 ± 5°C, the power supply can be restored by re-plugging the AC. When the temperature of the power shell exceeds 60+/-5°C, the output current of the power supply decreases from 12 ± 0.4A to 9 ± 0.4A. When the shell temperature drops to 50 ± 5°C, the power supply output current from 9 ± 0.4A reverts to 12A ± 0.4A.
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.

Timing Protection	When the charging time is over 12(±1) hours, the charger shall shut down. When the fault is removed, AC can be restored
Anti-Reverse Polarity Protection	When the battery polarity is reversely connected to the charger, the charger will not output. After troubleshooting, plug in AC again to recover

Regulatory	
Agency Approval	Designed to meet EN60335 (Certification by safety agency will be separately required)
Dielectric Strength (Hi-pot) Production test is 3 seconds	Primary to Secondary: 3000Vac / 10mA Max / 60seconds Primary to Earth: 1500Vac 10mA max./60 seconds Secondary to Earth: 1200Vac 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.

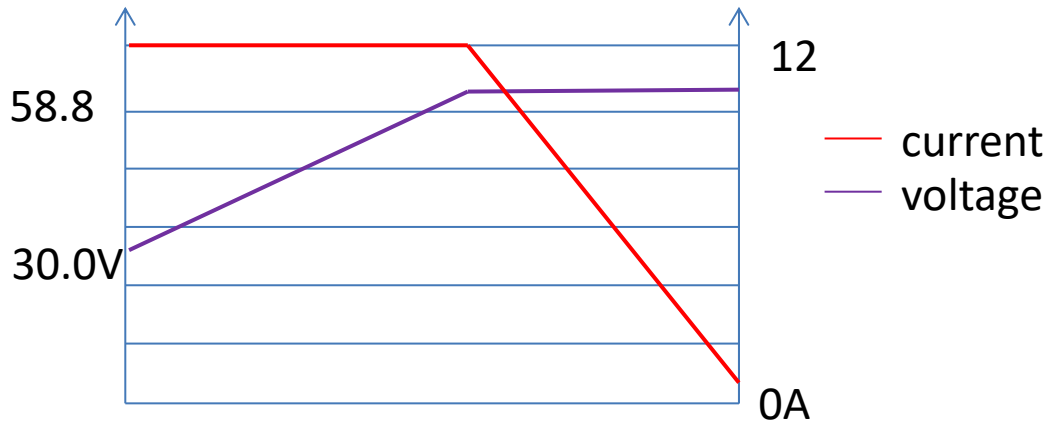
Electromagnetic Compatibility EMI/EMC	
EMI, RFI	Designed to meet EN55014
Immunity:	
EN61000-3-2	Harmonic current emission
EN61000-3-3	Voltage Fluctuations and Flicker
EN61000-4-2	ESD 8kV Air Discharge, 4kV Contact Discharge, Criteria B
EN61000-4-3:	Radio-Frequency Electromagnetic Field Susceptibility Test-Rs Level 3, Criteria A
EN61000-4-4	Electrical Fast Transient/Burst-EFT 1KV, Criteria A
EN61000-4-5	Surge Immunity Test, AC power line: line to line 2kV, line to each 4kV Criteria B
EN61000-4-6	Conducted Radio Frequency Disturbance Test-CS Level 3, Criteria A
EN61000-4-11	Voltage Dips, Criteria B

Notes: Specification is subject to change without notice.

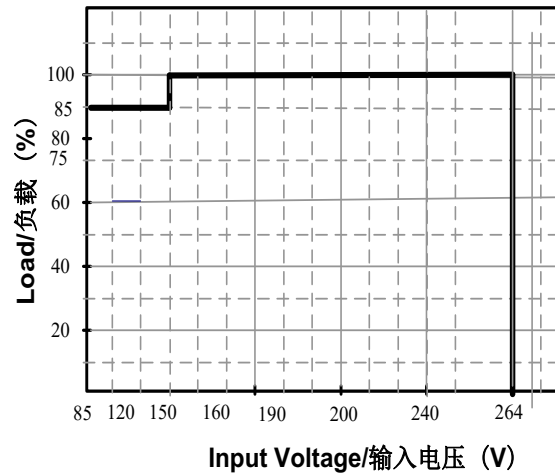
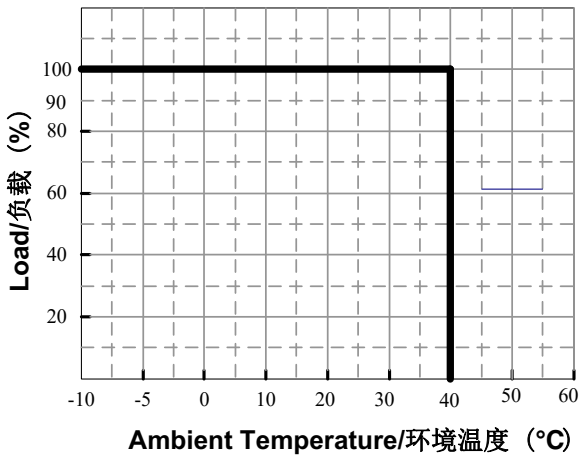
Communication Protocol

- The charger is designed with CAN communication,
- A 180 Ohm terminating resistor is included within the charger
- For more communication protocol information, consult factory.

Charge Curve



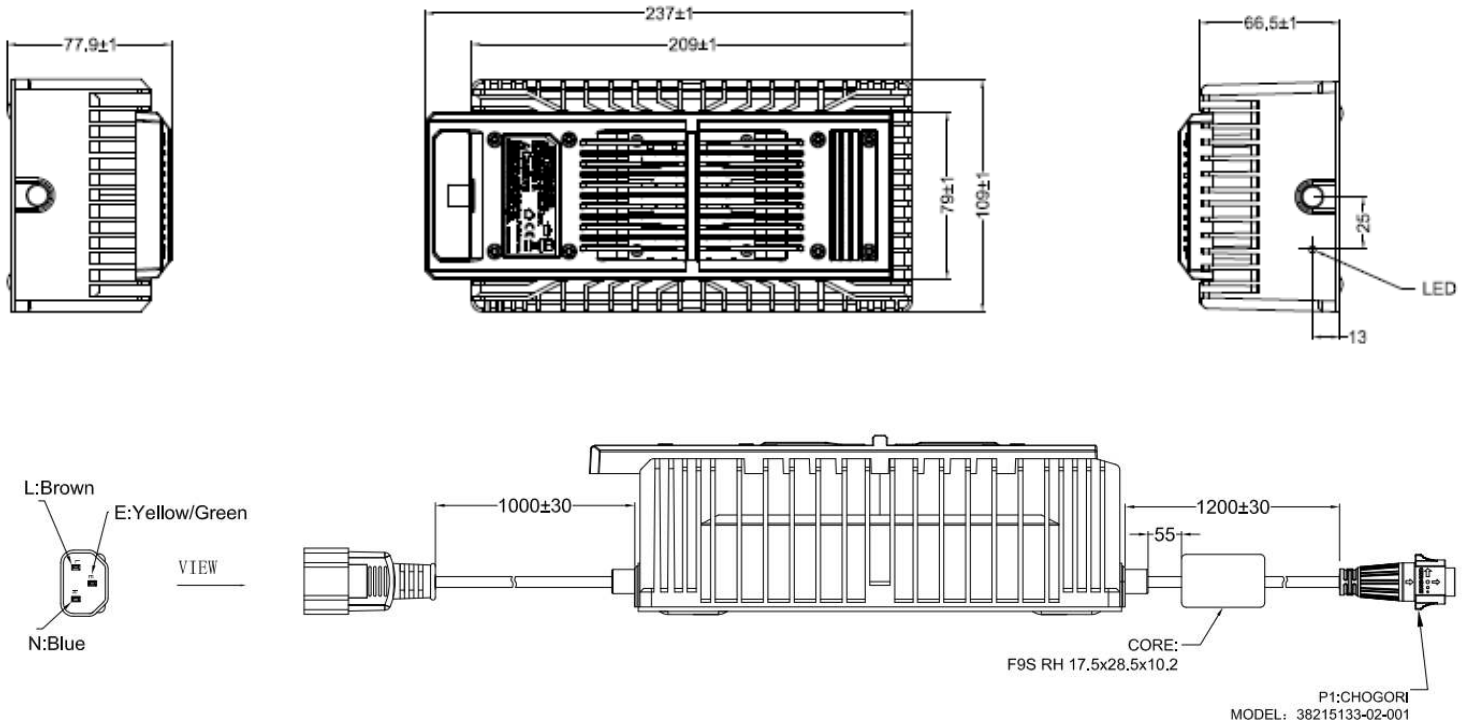
Derating Curves (Also see OTP notes)



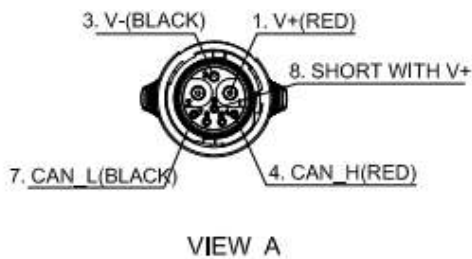
LED INDICATOR LIGHTS:

- Flashing GREEN: Abnormal communication or handshake without communication
- RED: On Charging
- GREEN: Charging complete
- Flashing RED: Charger ERROR
- All lights flashing: BMS ERROR /BMS
- No lights on: Charger not plugged into the wall or input UVP

MECHANICAL (Dimension and Outline Drawing (mm))



Connector info



P1 CONN Wire Sequence

NO.	FUNCTION	COLOR	NOTE
1	V+	RED	14AWG
2	EMPTY		WITH PIN
3	V-	BLACK	14AWG
4	CAN_H	RED	20AWG
5	EMPTY		WITH PIN
6	EMPTY		WITH PIN
7	CAN_L	BLACK	20AWG
8	PIN 8		PIN8 SHORT WITH V+

Connector Details:

- DC/Signal connector on charger: Chogori 38215133-02-001
- DC/Signal mating connector needed by customer: Chogori 38215636-02
- AC Socket: Standard C14