

2.4 kWatt Electric Vehicle Li-Ion Charger Data Sheet



Description:

The EVC-2400 Watt Series supports constant current, constant voltage, and constant power charging. The charging current and voltage are controlled through CAN communication. The charger has been designed for a variety of applications including the on board charging of Electric Vehicles and battery systems contained within them.

Features:

- Universal AC (90~264Vac) Input
- Ideal for 48V Battery Applications
- Communications via CAN Bus
- Fan Cool or Liquid Cool Options
- Efficiency Up to 93%
- Fully Encapsulated
- Over Voltage Protection
- Short Circuit Protection
- Over Temperature Protection
- Reverse Polarity Protection
- Waterproof IP66 Enclosure
- J1772 Options



Model Selection Table

AC Input Voltage	DC Output			Efficiency (typ.)	Cooling	Model Number (factory number)	J1772
Power	Voltage	Current					
90 – 264V	2400W	35 – 60V	0 – 40A	93%	Fan cooling	EVC-60-2400-FC (PLD2400-EVCS03-48)	No
						EVC-60-2400-J1772-FC (PLD2400-EVCS03-48FJ)	Yes
					Liquid cooling	EVC-60-2400 (PLD2400-EVCS03-48L)	No
						EVC-60-2400- J1772-J (PLD2400-EVCS03-48LJ)	Yes

Specifications:

Input & Output Parameters (All Versions)		Min	Typ.	Max	Units
Input Voltage Range (Designed to optimum performance at 115 and 220V nominal lines)		90	115/230	264	VAC
Input Frequency			45 – 65		Hz
Power Factor:	115 VAC Input, Half Load	0.98	0.99		
	230 VAC Input, Full Load	0.97	0.98		
Input Current:	115 VAC, Half Load			13	A
	230 VAC, Full Load			14	
Efficiency:	115VAC Input, Half Load		92		%
	230VAC Input, Full Load		93		
Measurement accuracy of DC output voltage			±1		%
Measurement accuracy of DC output current as a percentage of 40A			±5		%
Current Noise & Ripple – I _{out} (25°C – 20MHz bandwidth)				±25	% I _{out}
Turn-on Delay Time – Full Load				5	Sec
Rise Time – Full Load				500	ms
Output Parameters		Min	Typ.	Max	Units
Output Voltage		35	48	60	VDC
Output Current Range		5		40	A

*Note: Maximum output current is 20A for 90Vac to 185Vac input voltage, and 40A for 177Vac to 264Vac input voltage. (See typical charge curve)

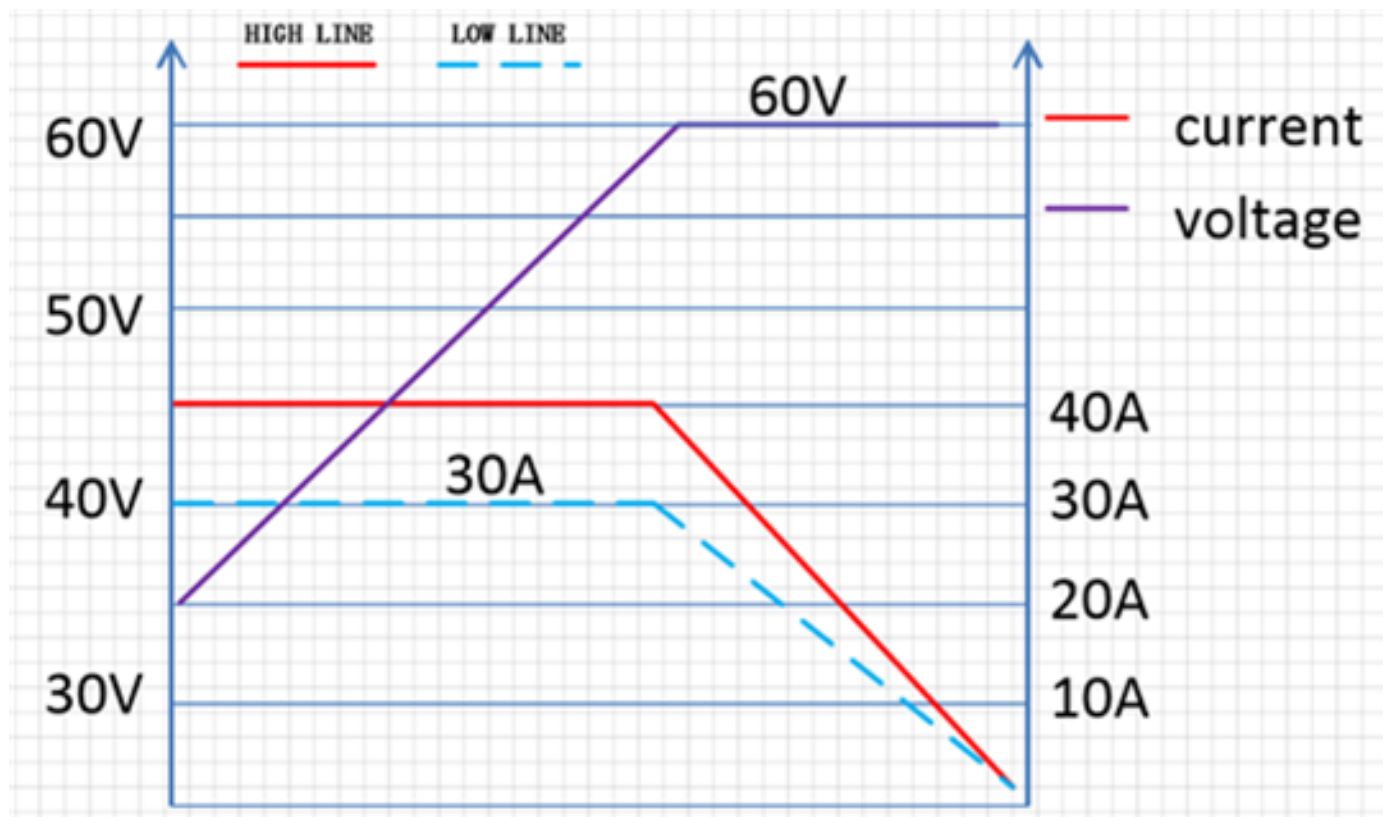
General Specifications			
Short Circuit Protection	Hiccup Mode—Self Recovery when fault is removed		
Over Voltage Protection	Enters auto recovery mode when the static output voltage is between 62V and 72V and the dynamic peak output voltage is below 80V.		
Over Temperature Protection	The unit will go into thermal protection when the case temperature exceeds 85 ±10 °C. The unit will enter hiccup mode and will self-recover when the temperature becomes normal at or below 85 °C.		
Reverse Polarity Protection	When the battery polarity is reverse connected the charger will have no output.		
Battery Under Voltage Protection	The charger shall not output if the sensed battery voltage is lower than 30±4V.		
Temperature (50° C to 60° C with power derating)	MIN	-25	°C
	MAX	+60	
Temperature - Storage	MIN	-40	°C
	MAX	+85	
Relative Humidity	10% ~ 90%		
Weatherproof	IP66 for Enclosure and fan IP25 – for the charger connector		
Case Size (Fan Cool Version)	9.45” x 7.36” x 2.76” 240mm x 187mm x 70mm		
Unit Weight	5.23kg (fan version)		
Agency Approval	Designed to meet UL2202		

Electromagnetic Compatibility EMI/EMC

EMI, RFI	Designed to meet EN55032 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
EN61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test-Rs
EN61000-4-4	Electrical Fast Transient/Burst – EFD
EN61000-4-5	Surge Immunity Test, AC power line: line to line 2kV, line to each 4kV
EN61000-4-6	Conducted Radio Frequency Disturbance
EN61000-4-8	Power Frequency Magnetic Field Test
EN61000-4-11	Voltage Dips
EN61547	Electromagnetic Immunity Requirements applies to Lighting Equipment

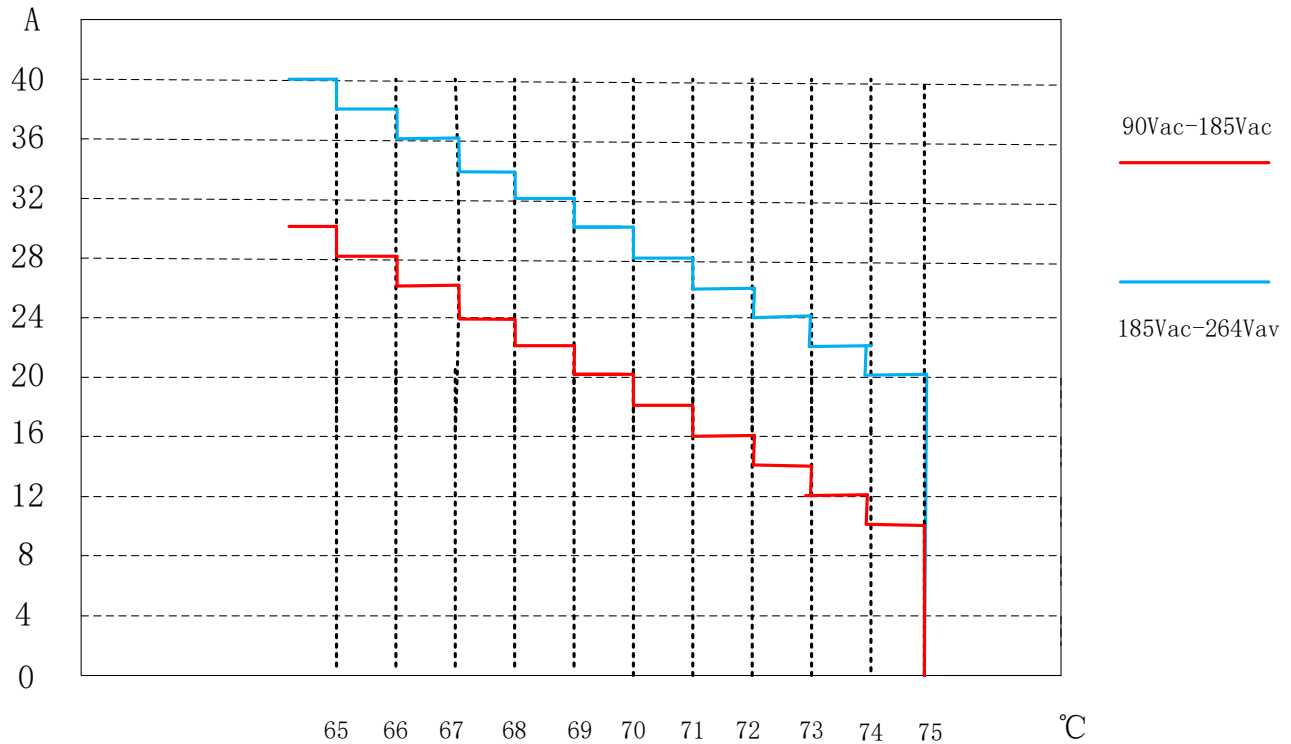
Notes: Specification is subject to change without notice.

Charging Curve (Typical):

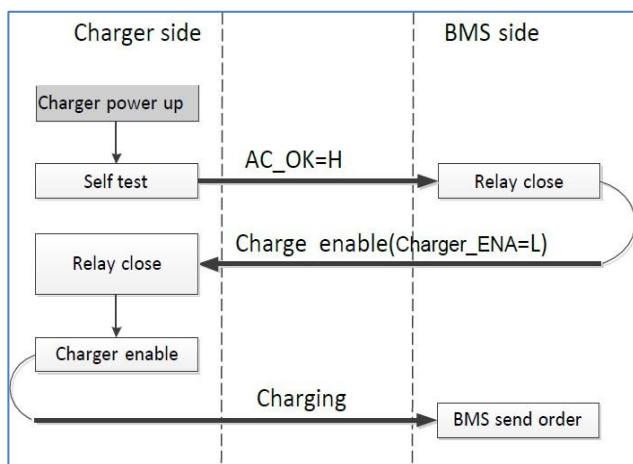


Derating Curve:

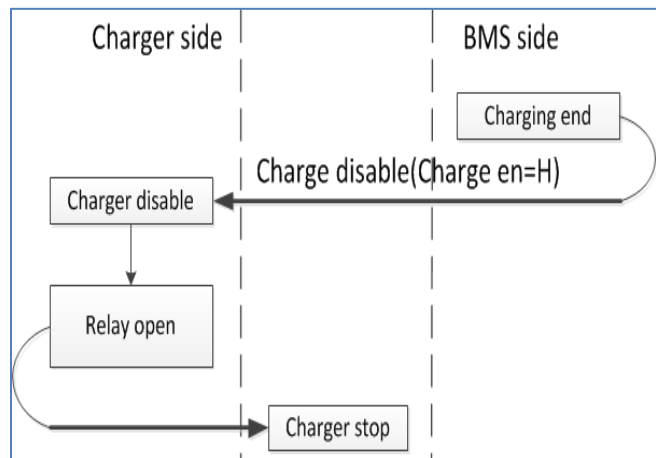
Charger will self-regulate output power to prevent overheating and resulting internal damages. When the case temperature is higher than 75±2°C, the charging current will approximately decrease by 2A step by step.



Power-on Timing



Power-off Timing



Charger Communication:

CANbus type CANopen communication capable, standard CANbus type CANopen and needs to be isolated. Charger will use a CC/CV. Charger should have a CANbus activated charge termination.

The communication is accomplished via CAN 2.0A Interface at 250kbps.

The charger can support bootloader function, so the application code can be flash-able through CAN to bootloader. The voltage reference of charger can be set in the range of 35 to 60V and through the internal determination it has two different power levels, if input AC voltage is between 90Vac to 185Vac, the max output power is 1800W, and if input voltage is between 177Vac to 264Vac, the max output power is 2400W.

In 2400W power mode, the value of the Charger Power Limit also can be set via CAN communication but must be not greater than 2400W otherwise it is forcibly considered to be 2400W and its current reference of charger can be set in the range of 5 to 40A.

- a) If the current reference set by the CAN Frame of Charger_control (0x54E or 0x54F) is less than 5A, the current reference is forcibly considered to be 5A.
- b) If the current reference set by the CAN Frame of Charger_control (0x54E or 0x54F) is greater than 40A, the current reference is forcibly considered to be 40A.

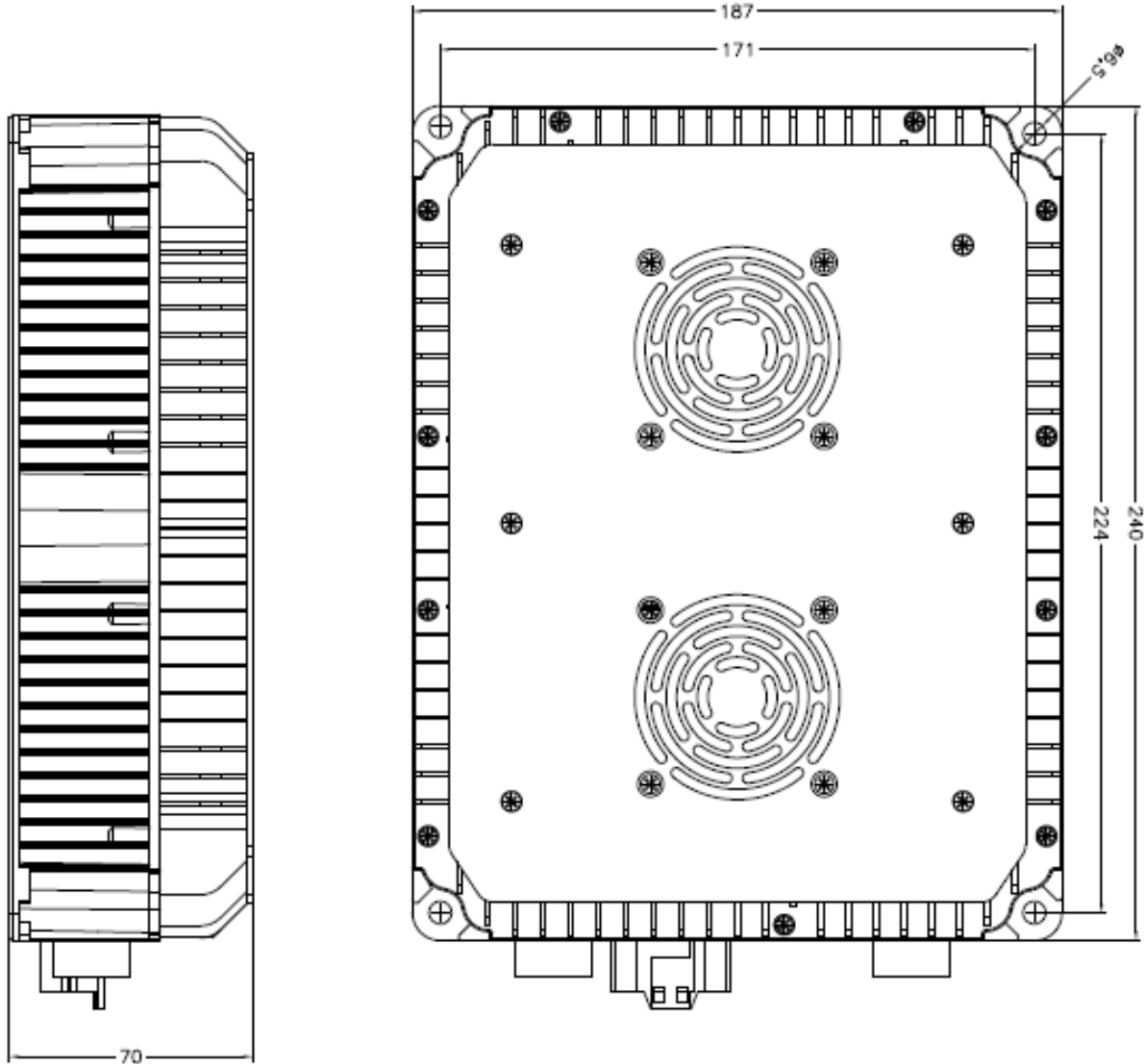
In 1800W power mode, the value of the Charger Power Limit also can be set via CAN communication but must be not greater than 1800W otherwise it is forcibly considered to be 1800W and its current reference of charger can be set in the range of 5 to 30A.

- a) If the current reference set by the CAN Frame of Charger_control (0x54E or 0x54F) is less than 5A, the current reference is forcibly considered to be 5A.
- b) If the current reference set by the CAN Frame of Charger_control (0x54E or 0x54F) is greater than 30A, the current reference is forcibly considered to be 30A.

The input AC current is limited to $14 \pm 0.5A$ between 90Vac to 264Vac.

Case Specifications (Fan version):

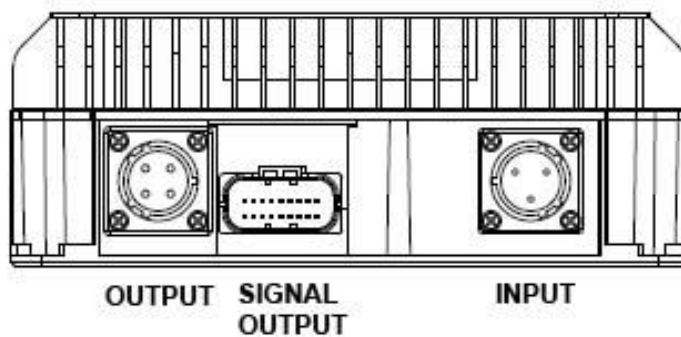
240mm x 187mm x 70mm (9.45" x 7.36" x 2.76") not including connectors; All below dimensions are in mm.



Output Connector: CNLINKO
YW20-J04SX-02-001

Signal Connector: JAE
MX23A18NF1

Input Connector: CNLINKO
YW20-J03SX-02-001



Case Connections:

Type	Socket on Charger	Plug to Charger (Not Supplied)
Input connector	CNLINKO YW20-J03SX-02-001	CNLINKO YW-20-C03PE-02-001
Output connector	CNLINKO YW20-J04SX-02-001	CNLINKO YW-20-C04PE-03-002
Signal connector	JAE MX23A18NF1	JAE MX23A18SF1

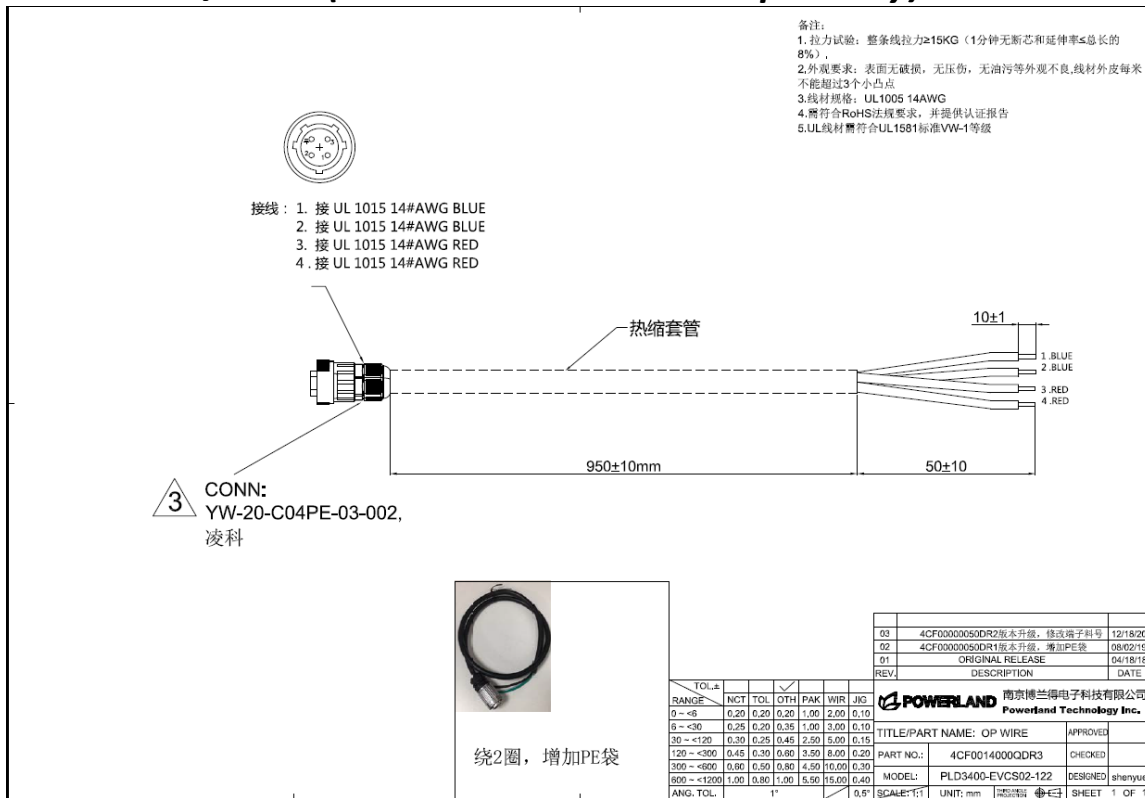
Output Pins: (All Output Voltage Versions):

Input Connector: CNLINKO YW20-J03SX-02-001		Output Connector: CNLINKO YW20-J04SX-02-001
Pin	Function	Function
1	L	VO-
2	N	VO-
3	Not applicable	VO+
GND	PE	VO+

Signal Pins (Connector: JAE MX23A18NF1):

Pin	Function
1	CAN_H1
2	CAN_L1
3	Not Connected
4	Not Connected
5	Not Connected
6	Test for Factory
7	+5VSB
8	Not connection
9	ISO_GND1
10	Not Connected or 12Vin (For J1772)
11	Not Connected or Slave_ENA1(For J1772)
12	Not Connected or PE (For J1772)
13	Not Connected or PROXIMITY (For J1772)
14	Not Connected or PILOT (For J1772)
15	Not Connected
16	Slave_ENA
17	CHARGE_ENA
18	12V_ISO1

Output connector/cable (Customer must order separately):



Input connector/cable (Customer must order separately):

