

## 3.5kW, 48Vout Electric Vehicle Li-Ion Charger Data Sheet

### Description:

The EVC-3500-Watt Ruby™ Series supports a 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 or Liquid Cooled 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	Power	Output Voltage	Current	Efficiency (typ.)	Model Number (factory number)	J1772	Cooling
90 – 264V	3500W @ 230VAC  2400W* @ 120VAC	35 – 60VDC	60A @ 230VAC  40A @ 120VAC	93% @ 230Vin  92% @ 120Vin	EVC-60-3500-FC (PLD3500-EVCS03-48)	No	Fan cooling
					EVC-60-3500-J1772-FC (PLD3500-EVCS03-48FJ)	Yes	
					EVC-60-3500 (PLD3500-EVCS03-48L)	No	Liquid cooling
					EVC-60-3500-J1772 (PLD3500-EVCS03-48LJ)	Yes	

\* Input current is limited to 16A max. (±0.5A).

## Specifications:

Conditions: All Models at 25 °C ambient, 230Vac in and full load unless noted.  
Specification is subject to change without notice.

Input Parameters		Min	Typ.	Max	Units
Input Voltage Range (Designed for optimum performance at 120 and 230Vin nominal)		90	120/230	264	VAC
Input Frequency			45 – 65		Hz
Power Factor	120VAC Input, Half Load	0.98	0.99		
	230VAC Input, Full Load	0.97	0.98		
Input Current	120VAC, Half Load			13	A
	230VAC, Full Load			16	
Efficiency	120VAC Input, Half Load		92		%
	230VAC Input, Full Load		93		

Output Parameters		Min	Typ.	Max	Units
Output Voltage		35	48	60	VDC
Output Current Range*		8		40/60	A
Measurement accuracy of DC output voltage			±1		%
Measurement accuracy of DC output current as a percentage of 40A			±5		%
Current Noise & Ripple – Iout (25°C – 20MHz bandwidth)				±25	% Iout
Turn-on Delay Time – Full Load				5	Sec
Rise Time – Full Load				500	ms

\*Note: Maximum output current is 40A for low input voltage and 60A for high input voltage. (See typical charge curve)

## General Specifications

Short Circuit Protection	Hiccup Mode with Self Recovery when fault condition 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	Charger has no output voltage when battery polarity is reversed.		
Battery Under Voltage Protection	Charger has no output if sensed battery voltage is below 30V (±4V).		
Temperature Ta (see power derating below -30°C and above +30°C)	MIN MAX	-40 +60	°C
Temperature - Storage	MIN MAX	-40 +85	°C
Relative Humidity	10% to 90%		
Weatherproof	IP66 for Enclosure and fan, IP25 – for the charger connector		
Case Size	Fan Cooled Liquid Cooled	240mm x 187mm x 70mm (9.45" x 7.36" x 2.76") 240mm x 187mm x 43.5mm (9.45" x 7.36" x 1.71")	
Unit Weight	5.25kg (fan version) 4.95kg (Liquid cooling)		
Agency Approval	Designed to meet UL2202		

## Electromagnetic Compatibility EMI/EMC

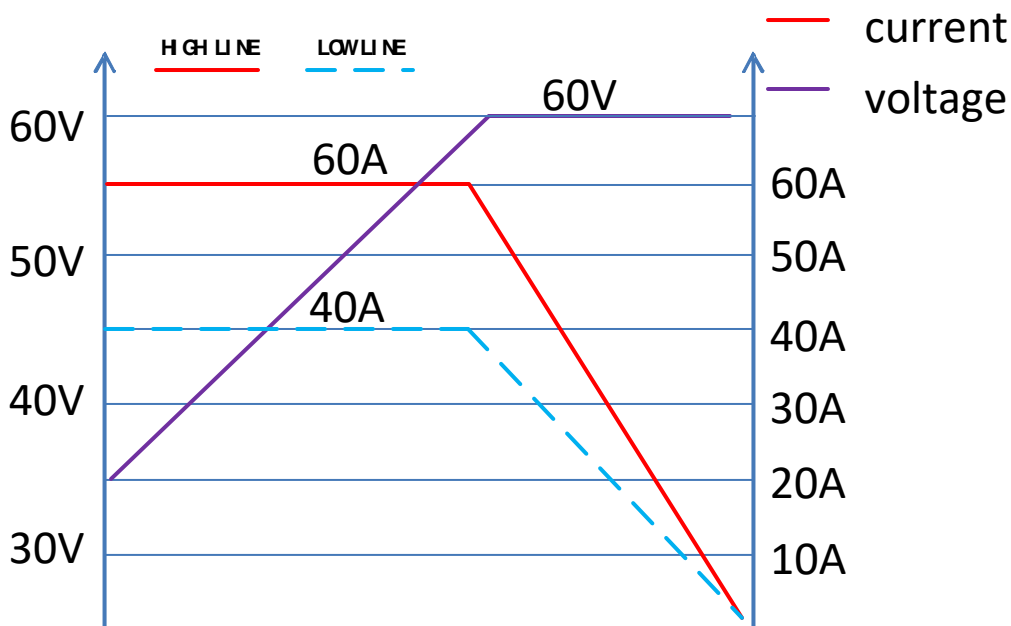
### Emission:

EMI, RFI	Designed to meet EN55032 Class B
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### 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

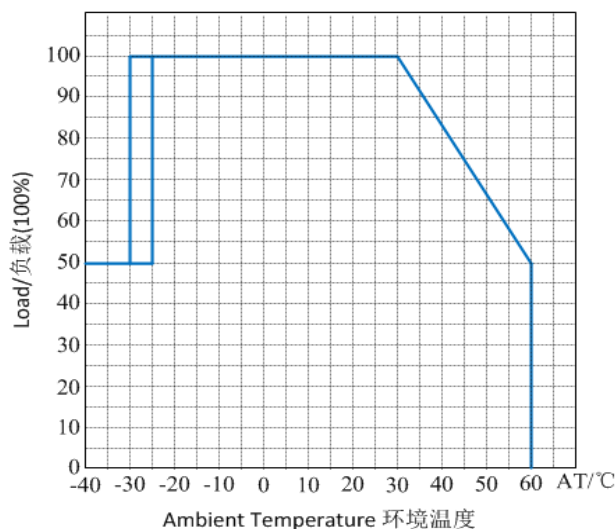
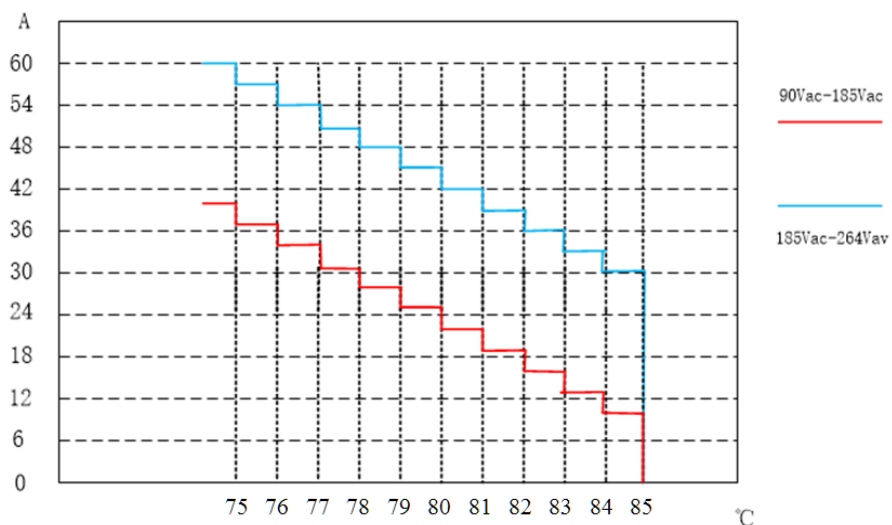
### Charging Curve (Typical):



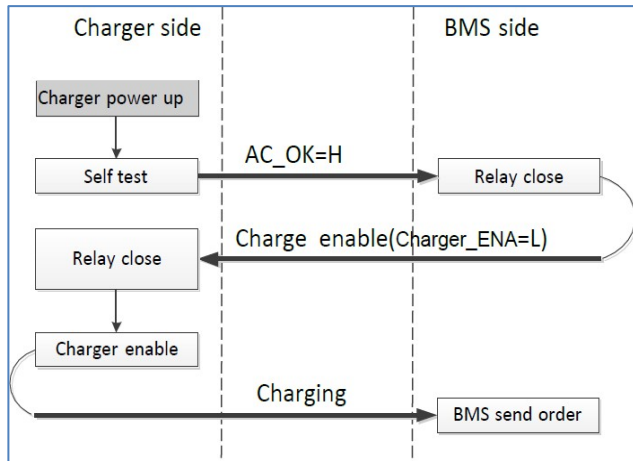
### Derating Curve:

The charger will self-regulate output power to prevent overheating and internal component damage. When the case temperature is higher than  $75\pm 2^{\circ}\text{C}$ , the charging current will approximately decrease by 3A by step.

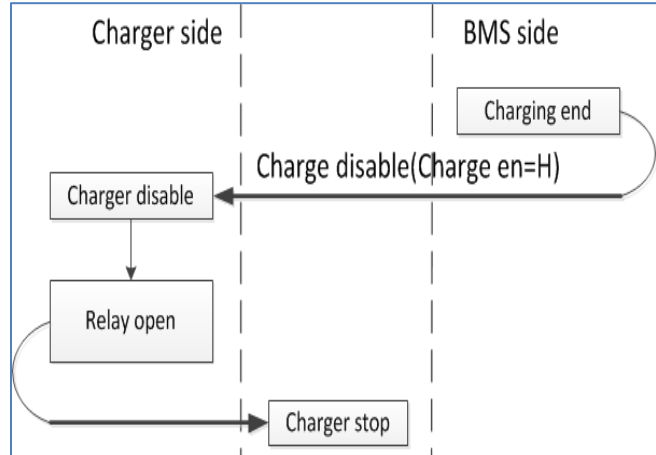
- Charger works with half load with ambient temperatures between  $-40^{\circ}\text{C}$  and  $-30^{\circ}\text{C}$ .
- Charger returns to work at full load once temperature rises above between  $-30^{\circ}\text{C}$  and  $-25^{\circ}\text{C}$ .
- Charger has linear derating of output power to 50% from  $+30^{\circ}\text{C}$  to  $+$ , and no power above  $+60^{\circ}\text{C}$  ambient temperature.



## Power-on Timing



## Power-off Timing



## Charger Communication:

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

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

The charger can support the bootloader function, so the application code can be flashable through CAN to the bootloader.

The voltage reference of the charger can be set in the range of 35 to 60V and through the internal determination it has two different power levels, if the AC input voltage is between 90Vac to 185Vac, the max output power is 2400W, and if the input voltage is between 177Vac to 264Vac, the max output power is 3500W.

**In 3500W power mode**, the value of the Charger Power Limit also can be set via CAN communication but must be not greater than 3500W otherwise it is forcibly considered to be 3500W and its current reference of charger can be set in the range of 8 to 60A.

- If the current reference set by the CAN Frame of Charger control (0x54E or 0x54F) is less than 8A, the current reference is forcibly considered to be 8A.
- If the current reference set by the CAN Frame of Charger control (0x54E or 0x54F) is greater than 60A, the current reference is forcibly considered to be 60A.

**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 8 to 40A.

- If the current reference set by the CAN Frame of Charger control (0x54E or 0x54F) is less than 8A, the current reference is forcibly considered to be 8A.
- 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.

The input AC current is limited to 16 max. (±0.5A) between 90Vac to 264Vac.

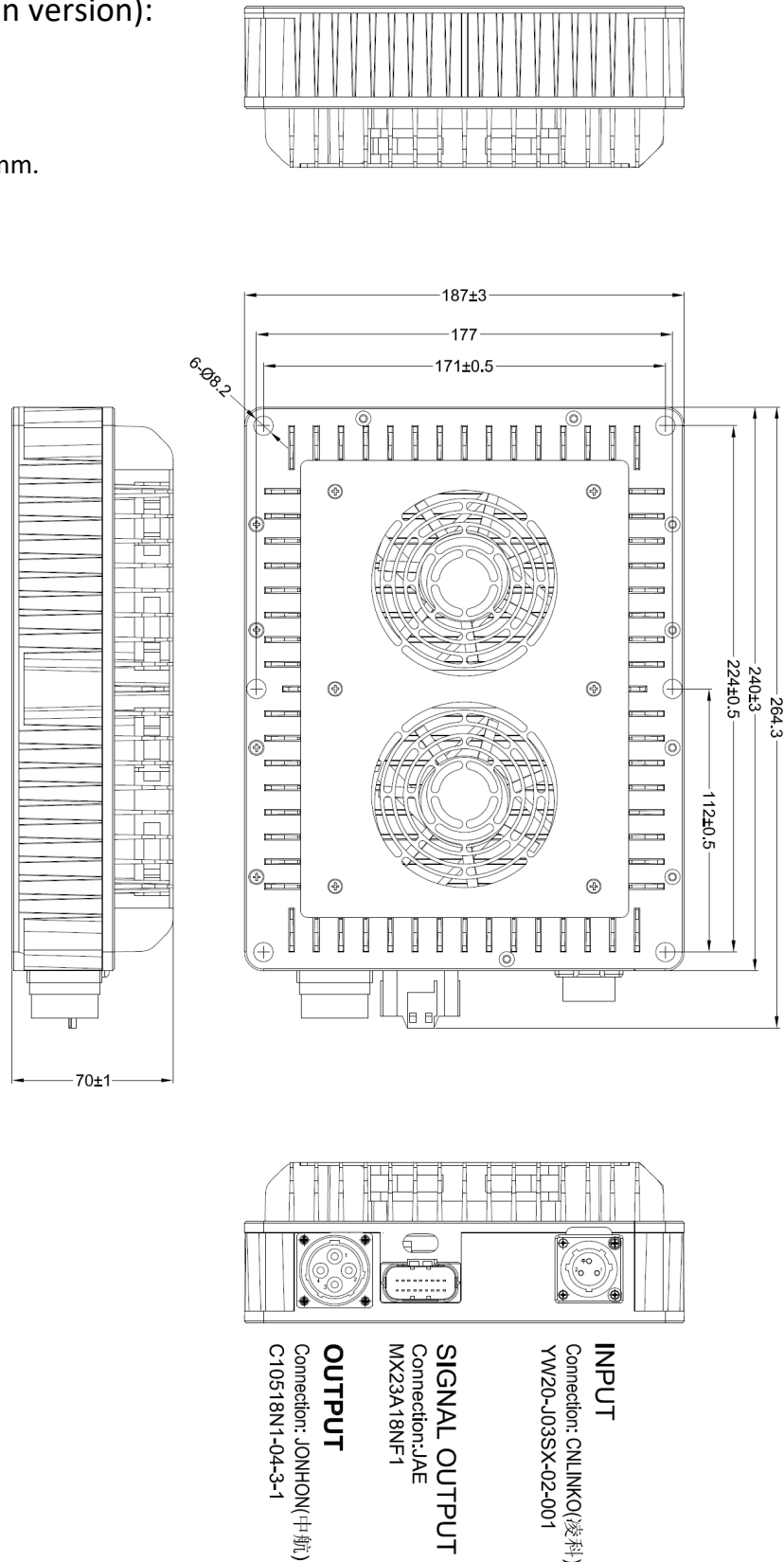
**Case Specifications (Fan version):**

240mm x 187mm x 70mm

(9.45" x 7.36" x 2.76")

not including connectors;

All below dimensions are in mm.



## 1.INPUT

CONN: YW20-J03SX-02-001, 凌科电气

CONN.No	DESCRIPTION
1	L
2	N
	PE

## 2.SIGNAL OUTPUT

CONN:JAE MX23A18NF1

CONN.No	DESCRIPTION	CONN.No	DESCRIPTION
1	Can_H	10	12VIN
2	Can_L	11	SLAVE_CHS
3	NC	12	PE
4	NC	13	PROXIMITY
5	NC	14	PILOT
6	TEST	15	NC
7	5VSB	16	SLAVE_ENA
8	NC	17	CHARGER_ENA
9	ISO_GND	18	12V_ISO

## 3. OUTPUT:

CONN. C10518N1-04-3-1, 中航

CONN.No	DESCRIPTION
1	V0-
2	V0-
3	V0+
4	V0+

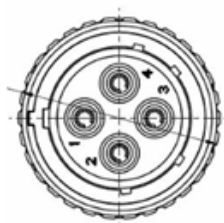
## Connector Information:

Type	Socket on Charger	Mating, Plug to Charger (Customer Side)
Input connector	CNLINKO YW20-J03SX-02-001	CNLINKO YW-20-C03PE-02-001 *
Output connector	JONHON C10518N1-04-3-1	JONHON C10518N1-04-1-2 *
Signal connector	JAE MX23A18NF1	JAE MX23A18SF1 *

\* Note: Mating connector are not supplied except Output connector which will be provided with samples.  
Please consult factory for production volume and supplier information.

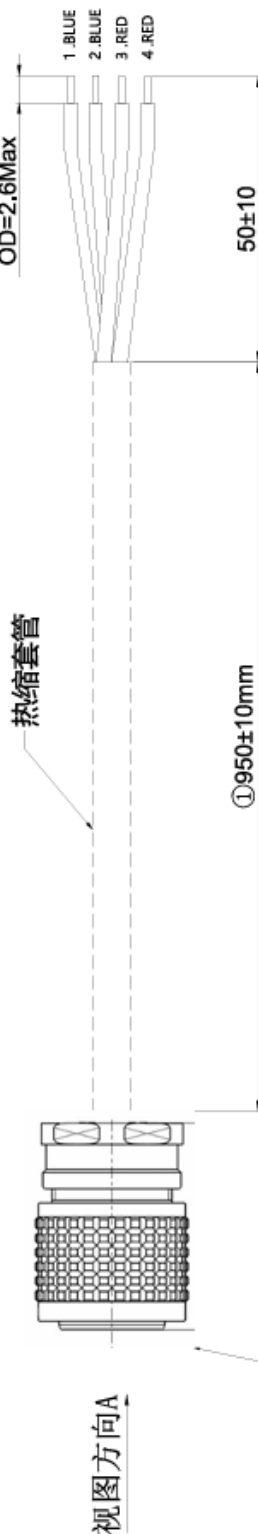
备注:

1. 外观要求: 表面无破损, 无压伤, 无油污等外观不良, 线材外皮每米不能超过3个小凸点
2. 线材规格: H07V-K 6mm², VDE认证
3. 需符合RoHS法规要求, 并提供认证报告
4. IEC线材需通过IEC60332标准的垂直燃烧试验
5. 带X号为重点检验项目, IQC重点检查



- ②接线:
1. 接 H07V-K 6mm² BLACK
  2. 接 H07V-K 6mm² BLACK
  3. 接 H07V-K 6mm² RED
  4. 接 H07V-K 6mm² RED

视图方向A



CONN:  
C10518N1-04-1-2,  
JONHON(中航光电)



绕2圈, 增加PE袋



