Instruction for

HF Battery Charger

HQ-F-2KW 高频电池充电机

使用说明 User Manual

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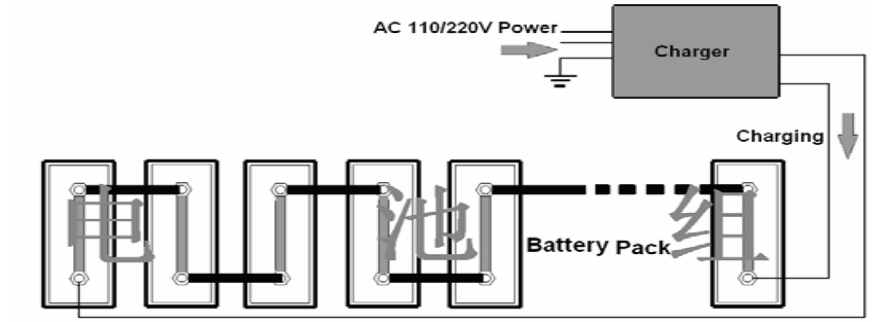
1. Overview

HQ-F-2KW on-board charger is an intelligent charger with small size, high efficiency, high protection grade and high seismic grade.

Charger's DC output connects to the power battery, and AC input connects to the vehicle's charging interface socket. Connect the mains electricity for power the charger through charging socket to achieve the function of battery power supplementary. Connection diagram as illustrated below.

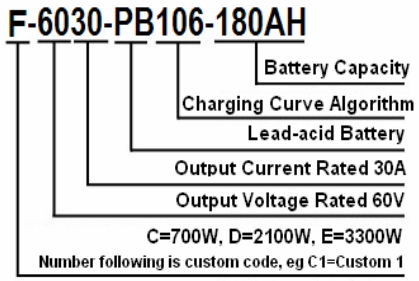


2. Model

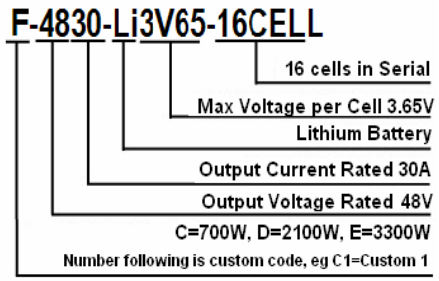
Model	Rated Output Voltage	Rated Output Current
HQ-F-48-30-XX-XX	48V	30A
HQ-F-60-30-XX-XX	60V	30A
HQ-F-72-25-XX-XX	72V	25A

Model Description

Charger Model for Lead-acid Battery



Charger Model for Lithium Battery



3. Expansion function

1) High efficiency up to 95%

2) Strong protection function

3) Wide temperature range of operating

4) 100% Full load aging test

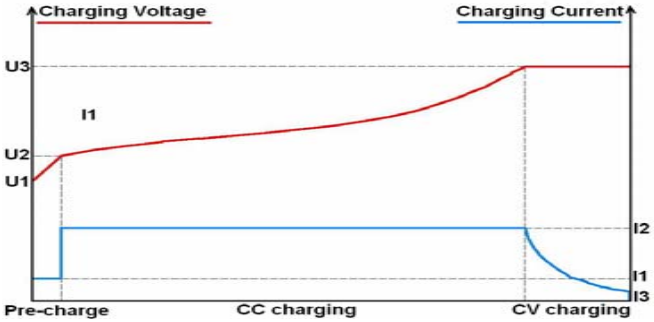
5) Full-sealed structure, protective level IP66

6) Automobile levels of ant-vibration grade

7) Intelligent temperature compensation function in the charging process, greatly extending the lifespan of battery

4. Techincal Parameters

1) CC/CV Charging mode：(for Lithium Battery)



U1= $\frac{U3}{2}$， U2=Ns×2.5V，U3=Maximum voltage for the battery pack

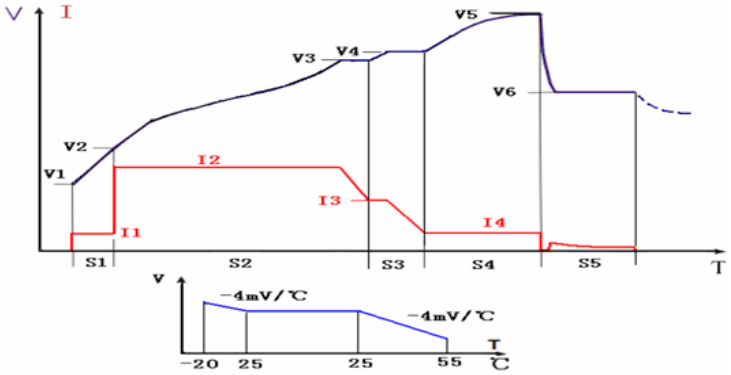
I1= $\frac{I2}{2}$， I2=Maximum charging current for the battery pack，I3= $\frac{I2}{6}$

① Pre-charge：It only enters into pre-charging process when the battery pack voltage is under U2 (The charger does not start when battery pack is under U1), then it operates in a constant current charging I1, finally, the pre-charging process is completed when voltage rises to U2.

② CC Charging：It operates in a constant current charging I2， then the CC charging ends when voltage reaches to U3.

③CV Charging：Constant voltage charging with U3, the whole charging process is completed when current reduces to U3.

2) According to different lead-acid battery types, there are different kinds of charging curves. The typical charging curve of CHILWEE battery as shown below,



5. Reliability Test

Index	Data definition	Remark
MTBF	150,000 H	Reliability is created by device failure rate

6. Environmental Working

S/N	Item	Tech Index
1	Working Temperature	-40℃~ +60℃
2	Storage Temperature	-40℃~ +90℃
3	Relative Humidity	5% ~ 95%
4	Cooling	Natural Cooling
5	Altitude	3000m

7. Electrical Characteristics

1) Input characteristics

Input currents and output powers (Input range available 220VAC±20%)

Input Voltage	Input Current	Maximum Output Power
185V	I_N≤15A	2000W
220V	I_N≤12.5A	2000W
265V	I_N≤10A	2000W

2) Output characteristics

Item	Rating Value	Error
DC Output Power - Maximum	2000W	/
Power-Maximum	≥95%	/
Power Factor	≥0.7	/

3) Protection Features

a) Output Over-voltage Protection

b) Output Over-current Protection

c) Output Short-circuit Protection

d) Output Reverse Connect Protection

e) Charger Temperature Protection

f) Battery Temperature Protection

4) Connectors

Item	Connector Model	Brand	Mating Connector	Remark
AC Input	DJ7031-4.8-11		DJ7031-4.8-21	Be earthed only
DC Output	∮ 8 lug		/	
Signal Wire	/	/	/	See page 13

5) Wire-harness

Item	Wire Core	Length	Harness processing	Remark
AC Input	2.5mm²	/		PE line only
DC Output	5mm²	/		
Signal Wire	0.3mm²	/		See page 13

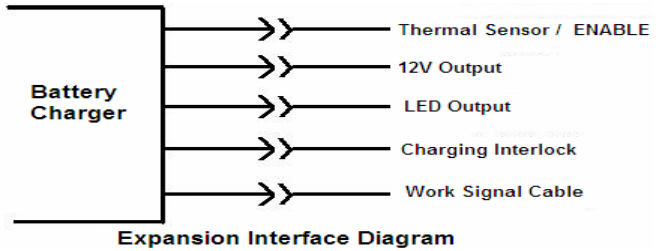
6) Stand by Power Consumption: Less than 5W

7) Impulse Starting Current: Less than 5A

8) Input Frequency

Minimum Frequency	Typical Frequency	Maximum Frequency
40Hz	50Hz/60Hz	70Hz

8. Expansion Function: Choose the accessories according to the actual needs



Expansion Interface Diagram

1) Thermal Sensor (to Lead-acid battery charger)

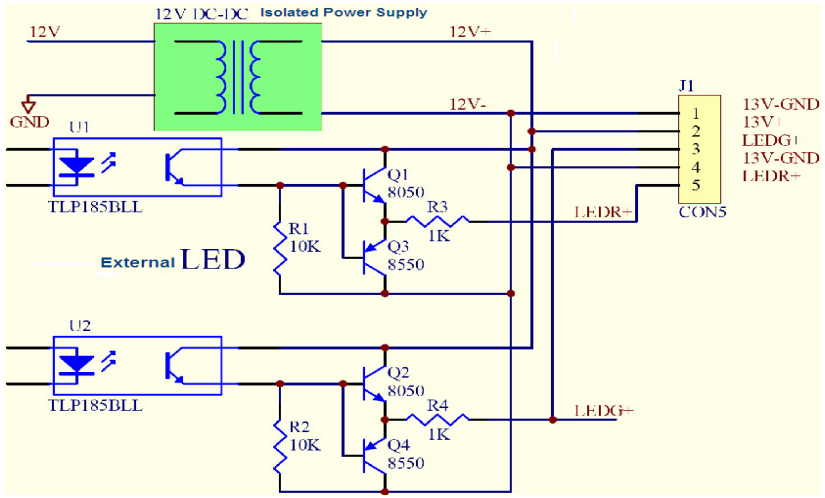
Recommend the temperature sensor configured to the lead-acid battery for detecting the battery's temperature and compensating the charging voltage, while at the same time to achieve battery overheat protection. It's better to attach the temperature sensor to one of the highest temperature cells. When the temperature sensor is not easy to install to the battery, you can fix the temperature sensor directly to the location which can detect ambient temperature. Do not be affected by the heat dissipated by the charger.

2) 12V Output Function

Charger provides a rated voltage 12V0.2A signal output. Its electrical connection and charger internal circuit is isolated to facilitate external application extensions.12V output and LED interface are common-grounded. As shown below,

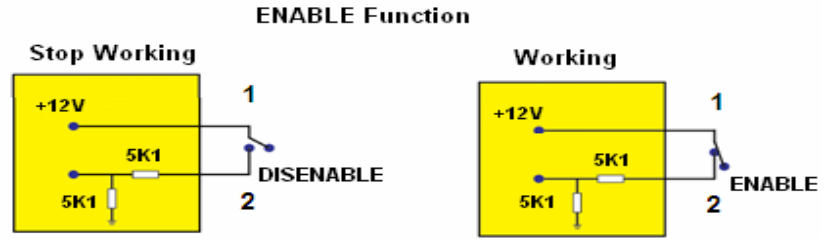
3) LED Output Interface

Charger provides a red-green LED interface. Its electrical connection and charger internal circuit is isolated to facilitate external application extensions. LED output interfaces diagram is shown as follows:



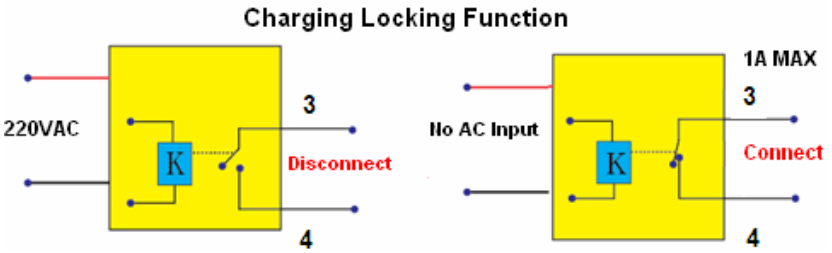
4) ENABLE Signal (for Lithium battery charger)

The enabled signal cable interface shares with temperature sensor. When the charger is programmed to the lithium battery, the temperature sensor disables. Using a lithium battery charger, you must use the enable signal cables controlling the charger to work and turn off. Recommand to have a lithium battery protection broad with signal relay interface, control the enable through relay, then control the charger to work and close.

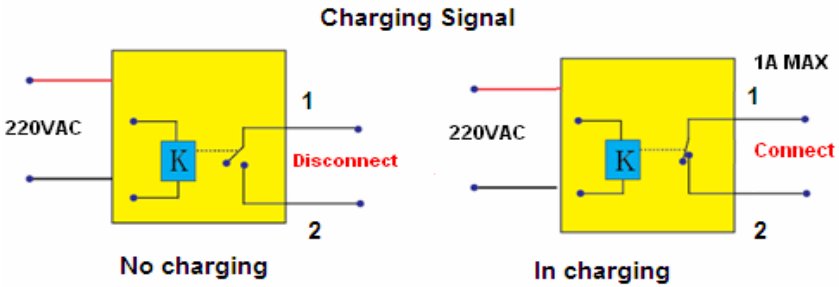


5) Charging Interlock Signal

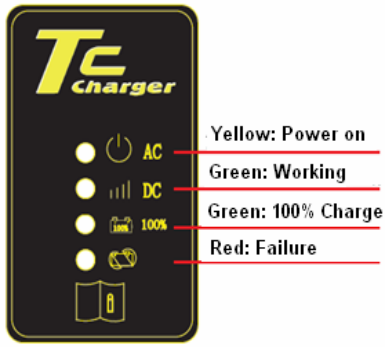
Charger provides a group of relay normally close contacts as charging interlock signal output. When the charger is not powered on, contacts connect. When the charger contacts to AC power, contacts disconnect immediately. Rated current of contact is 1A and withstand voltage 30V DC/250V AC.



6) Charger provides a group of relay normally open contacts as charging signal output. When the charger works normally, contacts connect. When the charger stops charging, contacts disconnect. Rated current of contact is 1A and withstandvoltage 30V DC/250V AC.



7) External Charging LED Indicator



"1"： LED flashes 1 second, "_" ： LED goes off 1 second

Failure Indicator State	Failure
1 _ _ _ _ _ _ _	Wrong Battery
1 _ 1 _ _ _ _ _	Charging Overtime
1 _ 1 _ 1 _ _ _	Battery Temperature Error

9. Safety features

1) Voltage-withstand

Terminals to earth (shell) and the dielectric strength of circuits without electrical connection to each other should withstand the test voltages. The testing voltage is AC voltage 50~60Hz. Test between terminals should not be a corona, ionization, arcing or breakdown phenomenon.

Input/Shell	1500V AC	1min	Leakage Current≤10mA
input/output	1500V AC	1min	Leakage Current≤10mA
Output/Shell	500V AC	1min	Leakage Current≤10mA

2) Insulation Resistance

The insulation resistance between live circuit and ground (shell) is not less than 20MΩ under the environmental temperature 23±2 ℃ and relative humidity 80% ~ 90%.

3) Contact Current

When human or animal contacts one or more devices or equipment palpable components, the current flow should be no more than the contact current perception threshold requirement in GB/T13870.1-2008. Grounding resistance is not more than 0.1Ω. Grounding wires must use yellow/green double color line.

Contact Current	AC Current mA	DC Current mA
Limit Value	≤0.75	≤2

10. Noise

Noise	Condition
≤65dB	Distance 1.5m, A weighted noise

11. EMC Properties

EMC accords with the article 11.3 of the electromagnetic environment test requirements in GB/T 18487.3-2001

12. Environmental Enclosure

Standard	Grade
GB4208-2008	IP66

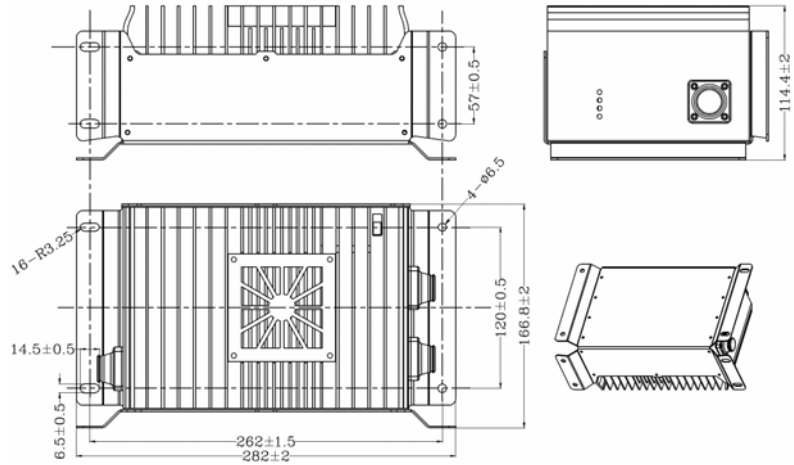
13. Lightning Protection Grade

Lightning Protection Index	Test Standards
TBD	/

14. Cooling

Natural air cooling.

15. Size L282mm(11.1'') ×W166.8mm(6.57'') ×H114.4mm(4.5'')



16. Installation & Safety Instructions

1) The charger should be installed in the vehicle on a level surface and keep the heat sink upright. A space of 10cm around heat sink should be open to ensure airflow.

2) Make sure all vents are not blocked. Hot air generated from the charger should smoothly drain out of the body. The space can't be sealed or half-sealed to prevent overheating and affect the properly working of the charger.

3) Do not put the charger near any heat sources. Charger around must have sufficient space to ensure convenient ventilation and easily pull out and dust-proof, to avoid accumulation of dust on the surface which affect the cooling of the charger.

4) To be considered waterproofing to the charger's installation location. Be careful to avoid splashing of water from the wheel, as well as the drip of other parts, such as condenser. , Ensure no liquids enter into the charger inside.

5) Make sure the power supply's voltage and current is consistent with the charger's input voltage and current allowed. If any doubt about it, please contact manufacturer or consult local power supply authority.

6) For safety and electromagnetic compatibility, the charger is equipped with three holes plug, applying with grounding line socket.

7) Please use the cable cord with the ability to sustain current. .If you are using an extension cord or power strip, make sure that the total of the amperes required by all the equipment on the extension is less than the extension's rating.

8) Under the maximum current, the voltage drop of the cable of the charger and battery should be as less as 1% of the battery voltage. Otherwise, it may affect the charging. Meanwhile, the diameter of the conductor shall meet the output current value.

9) If the battery voltage is needed to compensate, the temperature sensor shall be placed at the place of highest temperature, such as in the middle of two cells.

10) As found in the battery is not working properly or has been damaged, immediately unplug the power connector and charger interface, and contact the supplier.

11) Do not try to disassemble the charger yourself. Opening the cover may expose you to shock or other hazards.

17. Installation Diagram