Technical Specification

Model： HK-L

Name： 6.6KW On-board Charger

Version： V1.0

Issue Date： 2019-2-27

Tiecheng Information Technology Co., Ltd

Version	Update	Edit	Audit	Approval	Date
V1.0	Draft	Tianxiang Pan	Lizhen Tang	Hongbin Zhang	2019.2.27

Content

1 Overview

1.1 Subject

This document mainly defines the product specifications and performance parameters of On-board charger. It was designed and developed by Tiecheng Information Technology Co., Ltd according to China standards using for charging to the battery pack in the electrical vehicle. This product has the advantages of high efficiency, small volume, high stability, long life and etc. Also with the characteristics of high protection level, high reliability and complete protection function etc. It is the ideal power supply for the electrical vehicle. With thermal sensor built in the charger makes the charger has the self over thermal protection, it can recover automatically. Potting inside achieve more higher protection level, make it stable operation under complex environment.

1.2 Main Features

1.2.1 Support UDS diagnosis, with CAN wake-up function

OBC controls output voltage and current through CAN bus, and realizes information exchange with BMS and VCU and feedback of working status through can communication Self-diagnosis and Multi-protection Functions.

With UDS diagnosis function to realize the diagnosis, flash can be realize by remote. With self-diagnosis, input and output over voltage, under-voltage protection, short circuit protection, hardware fault protection, over-temperature protection and recovery functions.

1.2.2 Protection level with IP67

2 Charger Technical Specification

2.1 Environmental Specification

▲Working environmental temperature

Area	Lowest Temperature	Highest Temperature
Global	-40℃	60℃

▲Storage environmental temperature

Area	Lowest Temperature	Highest Temperature
Global	-40℃	85℃

▲Humidity：relative humidity 5%~95%，no condensation

▲Altitude：≤3000m

▲Working noisy：max when working ≤60dB，meet China standard QTC 895-2011

2.2 Charger regulatory requirements and reference standards

The design and manufacture of this product must meet the related requirements of vehicle which applicable regulations and standards in China, reference standards as following:

No.	Standard Code	Standard Name	Remark
1	QC/T 895-2011	Conductive on-board charger of electrical vehicle	/
2	GB/T 30512-2014	Prohibited substances requirement	/
3	GB/T 18387-2008	Limits and measurement methods for electromagnetic field emission intensity of electric vehicles, broadband, 9kHz~30MHz	/
4	GB/T 18384-2015	Safety requirements of electrical vehicle	/
5	GB/T 18487-2015	Electric vehicle conductive charging system	/
6	GB/T 28382-2012	Technical specifications for all-electric passenger vehicles	/
7	GB/T 14023-2011	Limits and methods of measurement for radio disturbance characteristics of vehicles, ships and installations driven by internal combustion engines	/
8	EN 55022	Electromagnetic compatibility test technology electromagnetic interference test of information technology products	/
9	EN 50178	General electrical and electronic safety standard	/
10	EN 61000-3-2	Electromagnetic compatibility test technology harmonic current emission test	/
11	EN 61000-3-3	Electromagnetic compatibility test technique voltage fluctuation and scintillation test	/
12	EN 61000-4-2	Electromagnetic compatibility test technology electrostatic release immunity test	/
13	EN 61000-4-3	Electromagnetic compatibility test technology radio frequency electromagnetic wave anti-interference test	/
14	EN 61000-4-4	Electromagnetic compatibility test technology electrical fast instantaneous/impact immunity test	/
15	EN 61000-4-5	Electromagnetic compatibility test technology surge immunity test	/
16	EN 61000-4-6	Electromagnetic compatibility test test technology radio frequency magnetic field induction conducted interference resistance test	/
17	EN 61000-4-8	Electromagnetic compatibility test technology power frequency	/

		magnetic field interference test	
18	EN61000-4-11	Electromagnetic compatibility test technology voltage drop anti - interference test	/
19	EN 61000-6-1	Electromagnetic compatibility test technology voltage drop anti - interference test	/
20	EN 61000-6-2	Electromagnetic compatibility test technology voltage drop anti - interference test	/
21	EN 61000-6-3	General standards for electromagnetic compatibility testing, radiation standards for residential, commercial and light industrial environments	/
22	EN 61000-6-4	General standard for electromagnetic compatibility test, radiation standard for industrial environment	/
23	GB/T 18655-2018	EMC technical requirements for electronic components and subsystems of passenger vehicles	/
24	GB/T 18655-2010	Limits and measurement methods for the radio disturbance characteristics of vehicles, ships and internal combustion engines used to protect vehicle-mounted receivers	/

3 Charger Safety Regulations Specification

Grounding resistance test	@25A/AC	≤100mΩ
Input insulation test	@1000V/DC	≥20MΩ
Output insulation test	@1000V/DC	≥20MΩ
Input withstand test	@2000V/AC 3S	Leak current≤15ma
Output withstand test	@2000V/AC 3S	Leak current≤10ma
Input to Output withstand test	@2000V/AC 3S	Leak current≤10ma

4 Charger Electrical Performance

4.1 Input

Input	Input voltage range	AC 90~265V
	Frequency	47~63Hz
	Input Current	≤32A
	Power Factor	≥0.98 @ ≥1650W
	Efficiency	≥93% full loading
	Stand-by power consumption	≤5W
	Other	NA

4.2 Output

Voltage Platform		108V	144V	312V	540V	600V	/	/
Output	Output Voltage Range	70-177 V	95-202 V	200~450 V	400~680 V	400~800 V	/	/
	Output Current	58A	46A	20A	14A	12A	/	/
	Output Power	6600W@220VAC 3300W@110VAC						
	Mode	CV / CC						
	CV Accuracy	±1%						
	CC Accuracy	±2%						
	Ripple Voltage Coefficient	5%						

4.3 Low Voltage Output

Low voltage Output	Output way	CV
	Output voltage	12V
	Nominal current	5.5A
	CV accuracy	±2%
	Output Power	≤66W
	Ripple voltage coefficient	≤1%

4.4 Control Interface

	CAN Communication	yes
	Baud rate	Optional for 125Kbps、250Kbps、500Kbps
	Terminal resistance	Not available

4.5 Other

EMI	Meet GB/T 18487.3-2001 11.3.1 and GB/T 18655-2018
EMD	Meet GB/T 18487.3-2001 11.3.2 and GB/T 18655-2018
Harmonic current	Meet GB 17625.1-2003 6.7.1.1
Protection level	IP67
Vibration resistance	10~25Hz swing 1.2mm，25－500Hz 30m/S^2，8hours each direction
Noisy	≤65dB （Class A）
MTBF	150000H

5 Charger Protection Functions

Protection unctions	Input over-voltage protection	AC270±5V
	Input low-voltage protection	AC85±5V
	Output over-voltage protection	When the maxium output voltage exceeds+2%,turn off the ouput,automatic recovery after fault removal
	Output low-voltage protection	Below the minimum output voltage -5%,turn off the output, automatic recovery after fault removal
	Over-temperature protection	Power start to decrease when internal temperature rise to 85℃, shut off when rise to 90℃
	Output short circuit protection	Stop output
	Output polarity reverse protection	yes
	Grounding protection	≤100mΩ
	CAN Communication protection	Automatically stop output when CAN communication fails
	Power-off protection	Yes

6 Interface

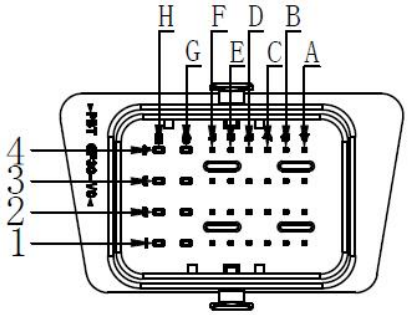
The interfaces in the charger can be grouped into two categories, one category is low voltage interface, the other is high voltage interface.

Low voltage interface includes control connector

High voltage interface includes AC220V input, DC output and HIVL

Connectors can be appointed by customer if quantity order is more than 5000pcs.

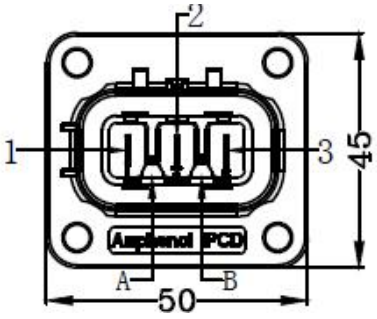
6.1 Low Voltage Connector and Pins Definition



Pin	Definition	Comments	**Note**
2F	CAN/GND		Used for shielding, no current
2G	NA		
2H	12V 5A Output Positive		
4A	CAN-H		
4B	CAN-L		
4C	HVIL+(High Voltage Internal Lock+）	Optional	
4D	HVIL- (High Voltage Internal Lock-）	Optional	
Others	NA		

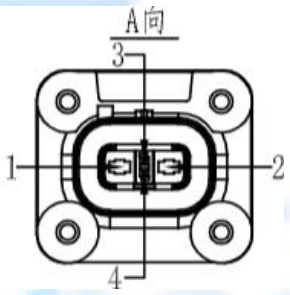
6.2 High Voltage Connectors and Pins Definition

6.2.1 AC Input



Brand	Pin	Definition
Amphenol	1	火线（L）
	2	地线（PE）
	3	零线（N）
	A、B	HVIL

6.2.2 OBC Output



Brand	Pin	Definition
TE	1	Positive
	2	Negative
	A、B	HVIL

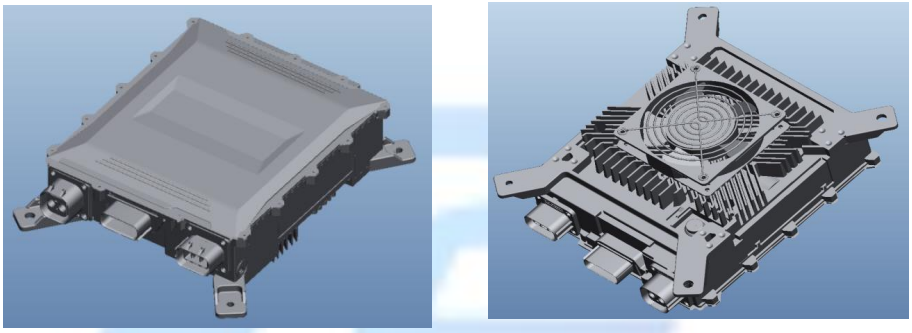
7. Size and Appearance

7.1 Size and weight

	Length（mm）	Width（mm）	Height（mm）	GW（KG）
Fan-cooled	312.8±3	268.4±3	111.2±3	＜10
Liquid-cooled	331.5±5	265.2±3	78.3±3	＜10

7.1 Appearance

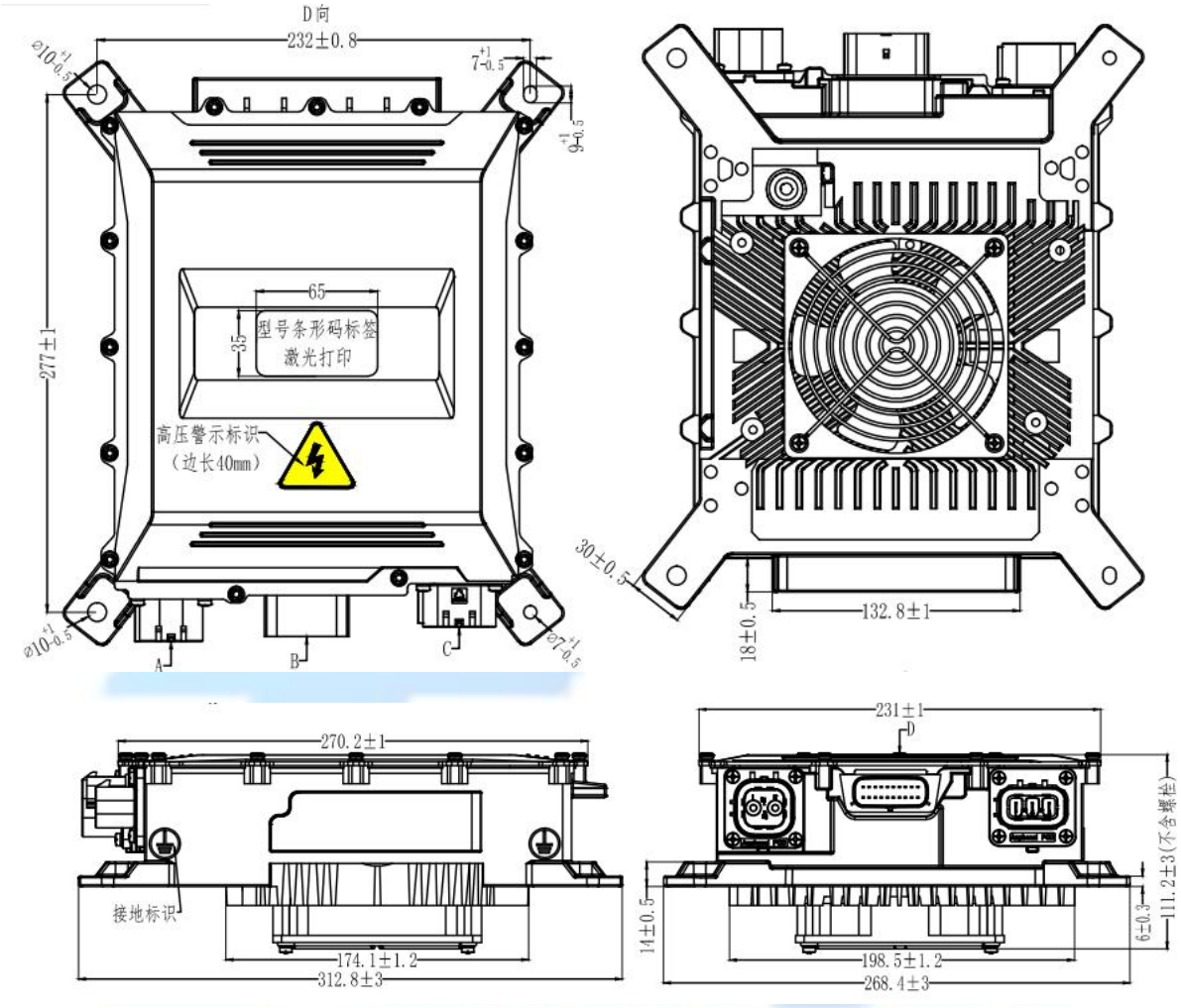
Air-cooled Appearance



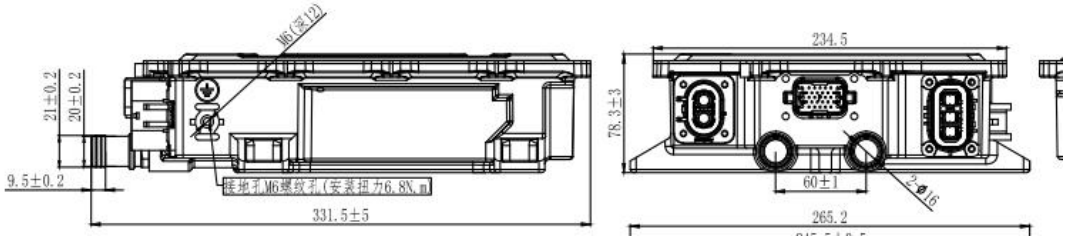
Liquid-cooled Appearance

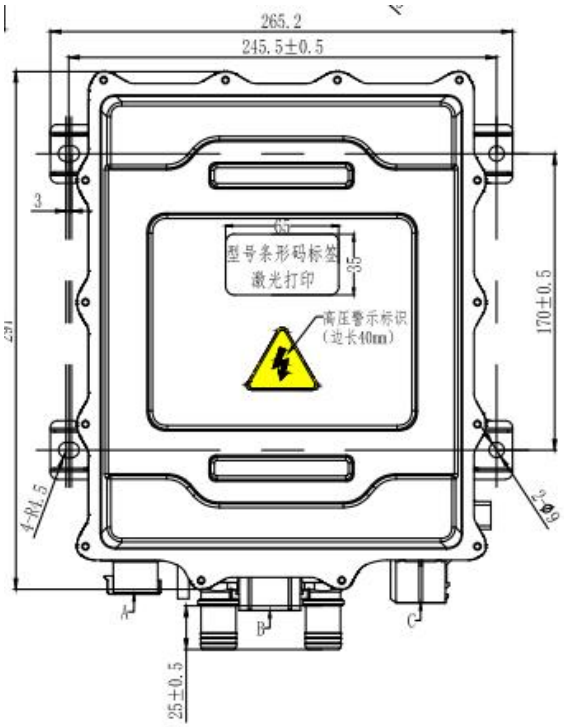
7.2 Drawing

Fan-cooled Drawing



Liquid-cooled Drawing





8. Nameplate, Package, Transport and Storage

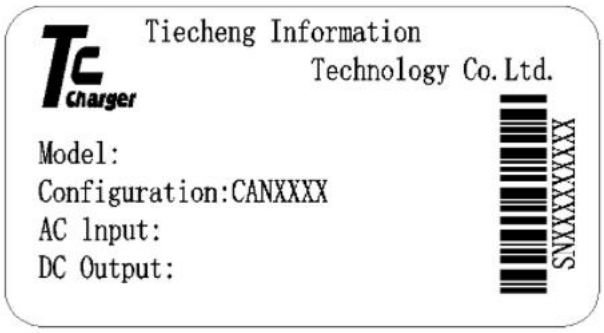
8.1 Nameplate

Require information in the nameplate shall be traceable

The basic parameters of the nameplate include: model, rated voltage, rated power, production date, serial number, etc.

High Voltage Label for reference

Nameplate is as following:



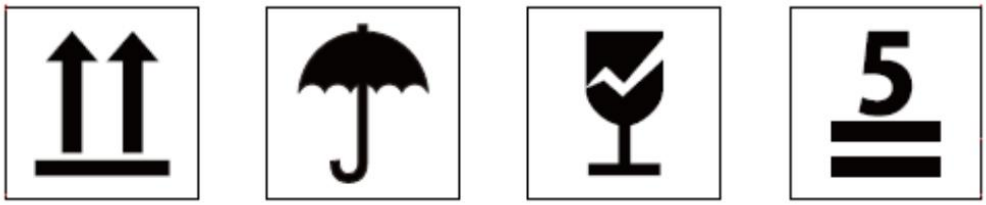
8.2 Package

The packing box shall be provided with product name, model, manufacturer identification, inspection certificate of the manufacturer's quality department, manufacturing date, etc; There is a list of accessories in the packing box:

No.	Item	Qty	Unit	Remark
1	On-board Charger	1	pc	
2	Outboard bill	1	pc	

8.3 Transportation

The product shall be transported in a firm packing box, which shall comply with the provisions of relevant national standards and shall be marked with "handle with care" and "moisture-proof". The packaging box containing the product can be transported by various means of transportation. Direct rain and snow and mechanical impact shall be avoided during transportation.



The products shall be stored in the packing box when not in use. The ambient temperature of the warehouse shall be -10-40 ℃ and the relative humidity shall not be greater than 80%. There shall be no harmful gas, flammable, explosive products and corrosive chemicals in the warehouse, and there shall be no strong mechanical vibration, impact and strong magnetic field. The packing box shall be at least 20cm above the ground and at least 50cm away from the wall, heat source, window or air inlet, The storage period under the specified conditions is generally 2 years, and the inspection shall be carried out again after more than 2 years.

The product shall be stored in a ventilated and dry place. At the same time, high temperature sources, fire sources and chemicals must be avoided. Store neatly to avoid throwing.

8.4 Safe Guide

Warning: remind the user that the operation is dangerous

* It is strictly prohibited to disassemble and refit the on-board charger for repair or commissioning
* Do not place the parts in the rain
* Please confirm that the housing is intact before installation. If it is damaged, please replace it immediately or contact the after-sales service department

* All plugs and sockets shall be connected firmly. If they are damaged or loose, please replace them immediately

*It is strictly prohibited to plug and unplug the connector when the product is powered on, otherwise personal injury may be caused

*It is strictly prohibited to open the product shell during the power on operation of the product, otherwise personal injury may be caused

* It is strictly forbidden to touch the high-voltage live parts of the product with bare hands. Please wear insulating gloves, insulating shoes Insulating clothing, live maintenance and detection are strictly prohibited

*During the replacement of fuses and contactors, barbaric operation is strictly prohibited to avoid damaging the product and causing potential safety hazards

* Three core cable with grounding wire shall be selected for AC power supply, and the grounding wire

* Please unplug the power plug if there is abnormal sound or smell during the operation of the charger

* Please keep away from fire sources and inflammables and explosives when the battery is normally charged

* Do not charge damaged or non rechargeable batteries

Note: remind the user that the following operations are important operations of the product

* Do not block the air inlet and outlet of the charger to prevent overheating

* Please make sure that the output cable is not too long to avoid the impact of line voltage drop on charging

* Please disconnect the power cord and charging plug when moving the charger

* The battery voltage must be consistent with the nominal voltage of the charger

* Avoid collision, compression, pulling, twisting or shaking the charging cable

* The product should be placed in a safe, ventilated, dust-free and rain free environment

* Please pack and store if not used for a long time