

Version	Change Description	Date (dd/mm/yyyy)
0	First edition	22/12/2021

# Combo 2.0kW DCDC+6.6kW OBC+PDU

## Model Number: GVD570-P6R6L2R0LLL-SXDY01

### Specification

#### 1 Product Overview

GVD570 P6 R 6 L 2 R 0 LLL SXDY01 is a three-in-one product for passenger cars, suitable for pure electric MPV, pure electric SUV and other models. The three-in-one includes 6.6 KW vehicle charger 2.5 KW DCDC module high voltage power distribution and HCM control board four parts. The product is used in the power battery system at 2 50 410 VDC, the low-voltage battery is a 12 V battery, and the AC input is at 176 26 4 VAC. The product has the characteristics of strict device selection, high reliability, long life, small size and high safety level.

#### 2 Product model name description

GVD570   -   P   6R6   L   2R0   L   L   L   -   A01  
 ①                      ②   ③           ④           ⑤           ⑥           ⑦   ⑧   ⑨

Mark	Description	Details
①	Product series	GVD570
②	Delimiter	--
③	Vehicle Type	Passenger car
④	Charger output power	6.6KW --- 6R6
⑤	Charger output voltage	L: 200VDC-430VDC
⑥	DCDC output power	2KW --- 2R0
⑦	DCDC input voltage	L: 200VDC-450VDC
⑧	DCDC output voltage	L: 14VDC
⑨	Cooling method	L: liquid cooling

#### 3 Product model and its main rated electrical parameters

##### 3-1 Model

Product name	Model Number
Combo 2.0kW DCDC+6.6kW OBC+PDU	GVD570-P6R6L2R0LLL-SXDY01

##### 3-2 Electrical parameters

Specifications	Parameters	Unit	Remark
System environment requirements			

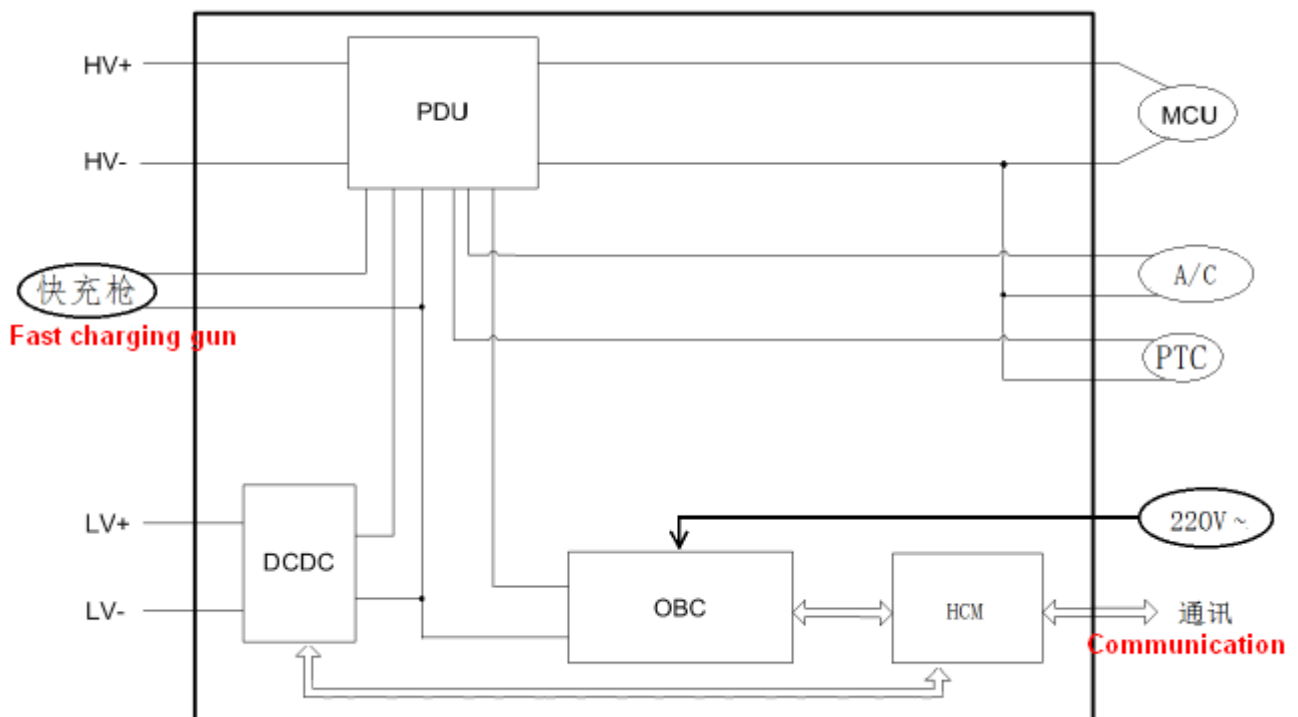
Working temperature	-40~+85	°C		
Altitude	0-5000	M		
Cooling method	Liquid			
Coolant flow	16	L/min	50% water: ethylene glycol or propylene glycol	
Coolant temperature range	-40~+65	°C		
IP Level	IP67		Test with plug	
Operating voltage range	250~410	VDC	Rated 360/380 V	
CAN baud rate	500kbps Or according to customer agreement			
DC/DC				
Rated input voltage	361	VDC	Compatible with 360 /380VDC	
Input voltage range	200~450	VDC		
Rated output voltage	14	VDC	Error ±0.3VDC	
Output voltage range	9~16	VDC	Can be adjusted by software	
Rated output power	2.0	kW	Actual use power	
Rated output current range	0~142	A		
Peak output power	2.5	kW	According to GB/T	
Peak output current	178	A	According to GB/T	
Output voltage ripple	≤500	mV	The bandwidth of the oscilloscope is limited to 20MHz at room temperature. A 10uF electrolytic capacitor and a 0.1uF ceramic capacitor are connected in parallel with the voltage probe.	
Response time	<10	mS		
Overall efficiency	≥94	%	Rated input and output	
Control method	CAN control			
Wake-up function	Support		CAN and hardware wakeup	
Parking charging	Support			
Loss	Wake up	≤2	W	KL15 power supply only message communication
	Power on without load	≤10	W	@Input 361VDC, output 14VDC, no load

Protective function	Input overvoltage protection	$\geq 455$	VDC	Shut down, self-recovery after troubleshooting
	Input overvoltage recovery	$\leq 450$	VDC	
	Input undervoltage protection	$\leq 190$	VDC	Shut down, self-recovery after troubleshooting
	Input undervoltage recovery	$\geq 200$	VDC	
	Output overvoltage protection	$\geq 18$	VDC	Shut down, self-recovery after troubleshooting
	Output overvoltage recovery	$< 18$	VDC	
	Output overcurrent	$\geq 190$	A	
	Output short circuit	Yes		Shut down, self-recovery after troubleshooting
	Over temperature	105	$^{\circ}\text{C}$	If the sampling point is lower than $-40^{\circ}\text{C}$ or higher than $105^{\circ}\text{C}$ , shut down, after troubleshooting recover
	Output anti-reverse	Yes		No output
<b>OBC</b>				
Rated input voltage		220	VAC	Compatible with 220/230/240VAC
Input voltage range		176~264	VAC	
Rated input voltage frequency		50	Hz	Compatible with 50/60Hz
Input voltage frequency		44~55	Hz	
Rated output power	Main road	6600	W	176~264VAC input, Po max 6.6kW
	Side road	60		
Rated output voltage	Main road	361	VDC	
	Side road	13.8		
Output	Main road	200~430	VDC	Main circuit output voltage

voltage range	Side road	13.8±0.5		can be adjusted according to BMS request	
Output voltage ripple (main circuit)		≤5	%		
Maximum output current (main circuit)		max.18	A	Controllable charging current	
Stabilization accuracy (main circuit)		≤±1	%		
Load regulation rate (main circuit)		≤±1	%		
Output current (auxiliary circuit)		max.4.3	A		
Overall efficiency		≥94	%	Rated input and output	
Protective function	Input overvoltage protection	≥268	VDC	Shut down, self-recovery after troubleshooting	
	Input overvoltage recovery	≤264	VDC		
	Input undervoltage protection	≤170	VDC	Shut down, self-recovery after troubleshooting	
	Input undervoltage recovery	≥175	VDC		
	Output overvoltage protection	>435	VDC	Shut down, self-recovery after troubleshooting	
	Output overvoltage recovery	≤435	VDC		
	Output undervoltage protection	≤205	VDC	Shut down, self-recovery after troubleshooting	
	Output undervoltage recovery	≥214	VDC		
	Output short circuit	Yes			Locked, manual power-on recovery is required after troubleshooting
	Over temperature	114		℃	When the maximum temperature of the sampling point exceeds 114

High voltage power distribution			
Lithium battery port	Yes		Standard
Fast charging port	Yes		Standard
MCU port	Yes		Standard
Air compressor port	Yes		Standard
PTC port	Yes		Standard
DCDC output port	Yes		Standard
OBC input port	Yes		Standard
Low voltage communication port	Yes		Standard
Contact adhesion detection	Yes		Standard
High voltage interlock	Yes		Can be deleted according to customer requirements

#### 4 System block diagram



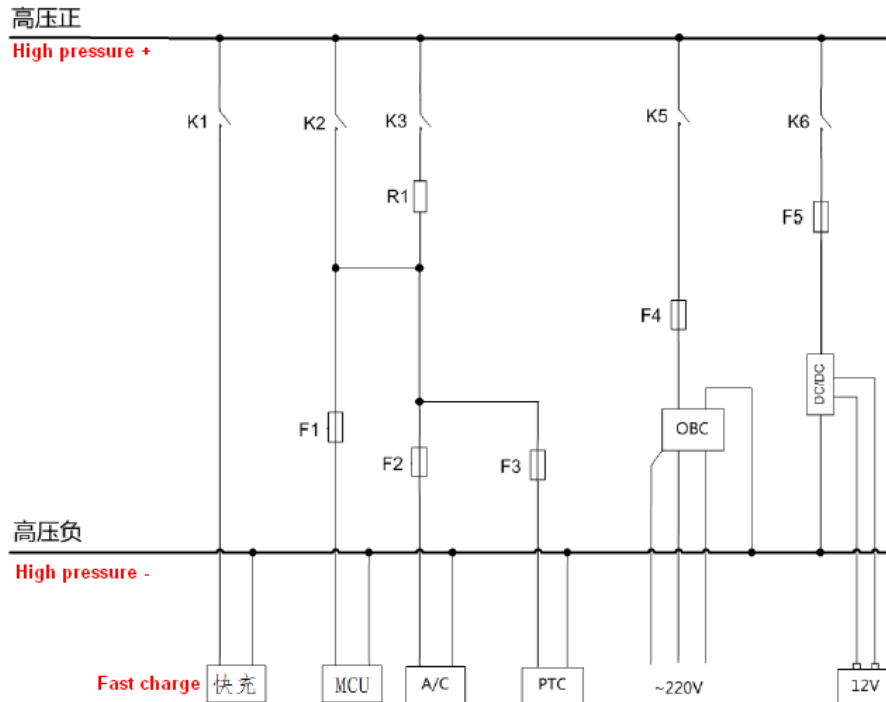
#### 5 Hardware logic block diagram and interface definition

##### 5.1 Main circuit terminal composition

##### 5.1.1 Main circuit logic block diagram

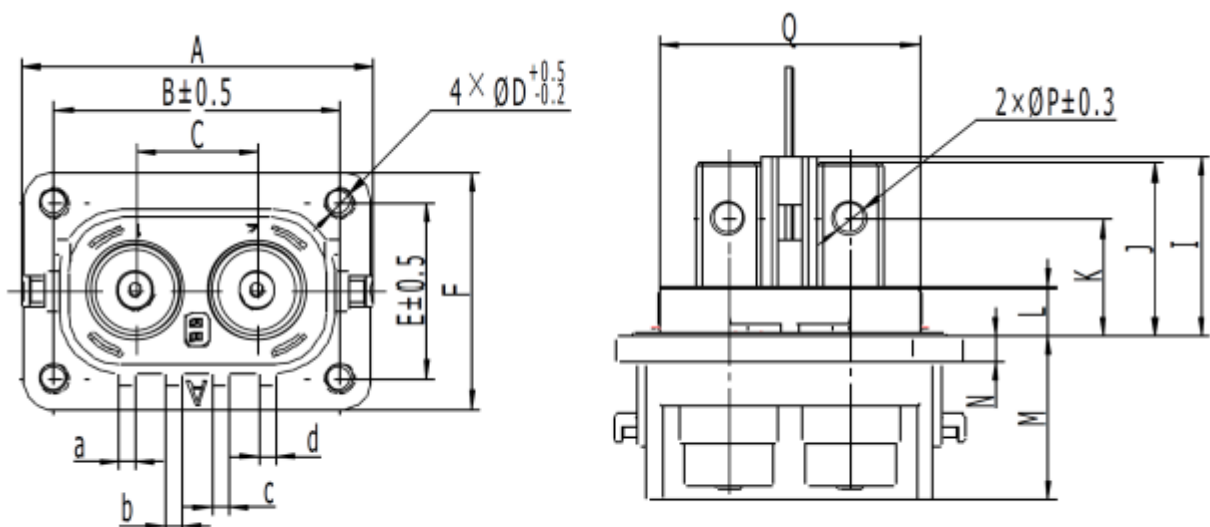
The following high voltage wiring diagram

As shown, the main circuit mainly includes four modules. One HCM: each relay drive, relay adhesion detection, each power distribution circuit protection and signal processing. Two DCDC: used to convert high-voltage electricity into low-voltage electricity, to charge vehicle equipment and 12V batteries Three OBC: Convert single-phase mains power to DC high voltage to charge the high voltage battery pack; Four PDU: Realize the switch control and integration of the front module, A/C, PTC, fast charge and other units.



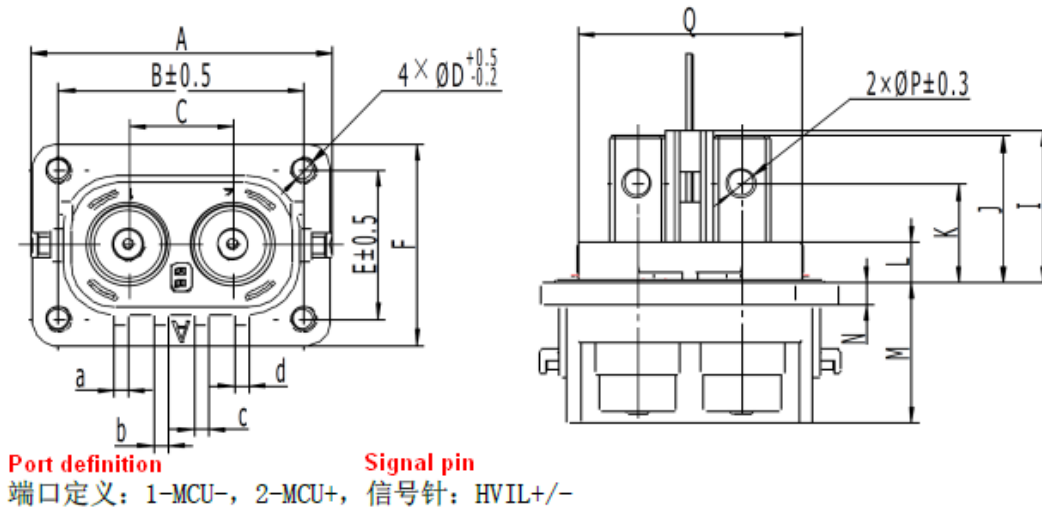
### 5.1.2 Main circuit terminal function description

1) Lithium battery socket as shown in the figure below:

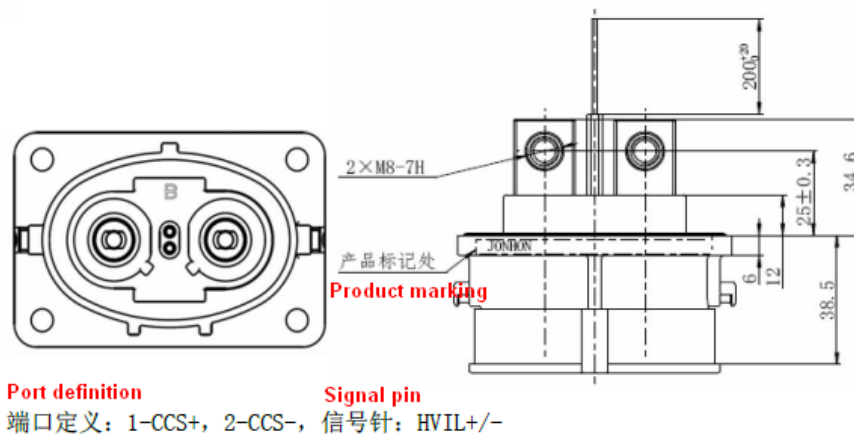


**Port definition**      **Signal pin**  
端口定义: 1-BAT+, 2-BAT-, 信号针: HVIL+/-

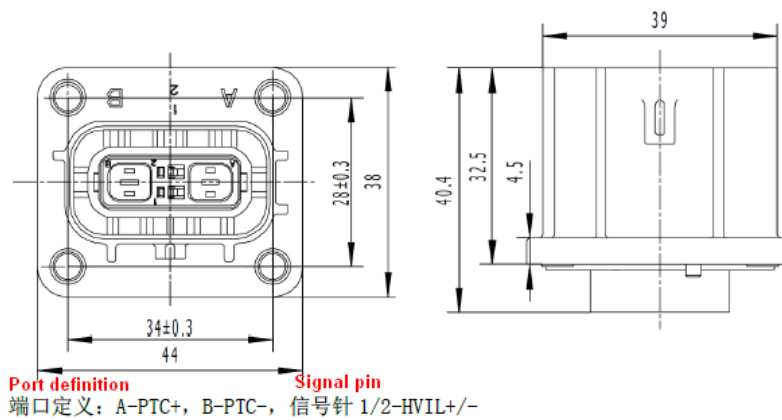
2) MCU socket as shown in the figure below:



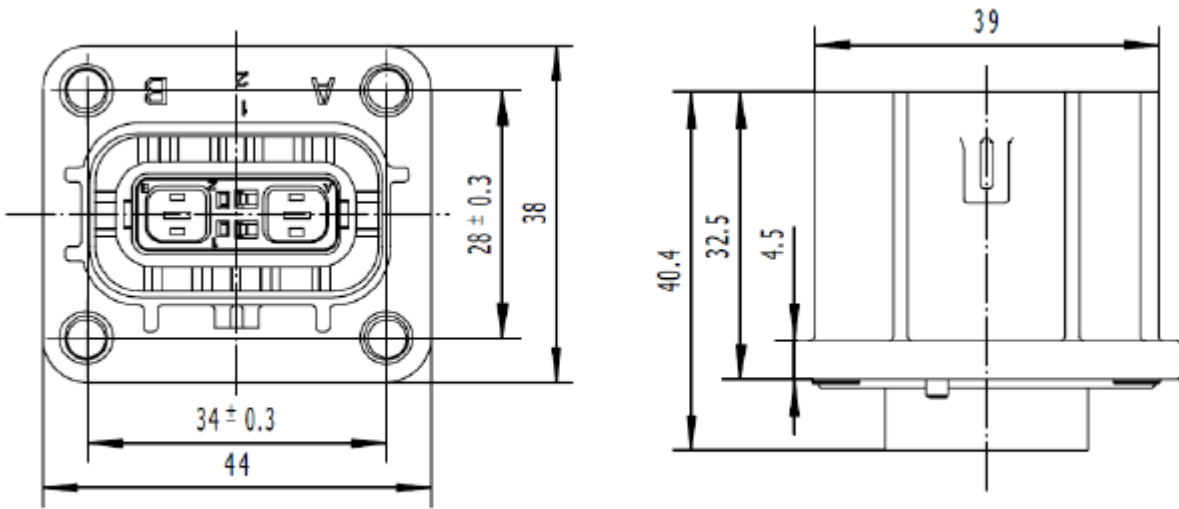
3) Fast charging socket as shown in the figure below:



4) PTC socket as shown in the figure below:

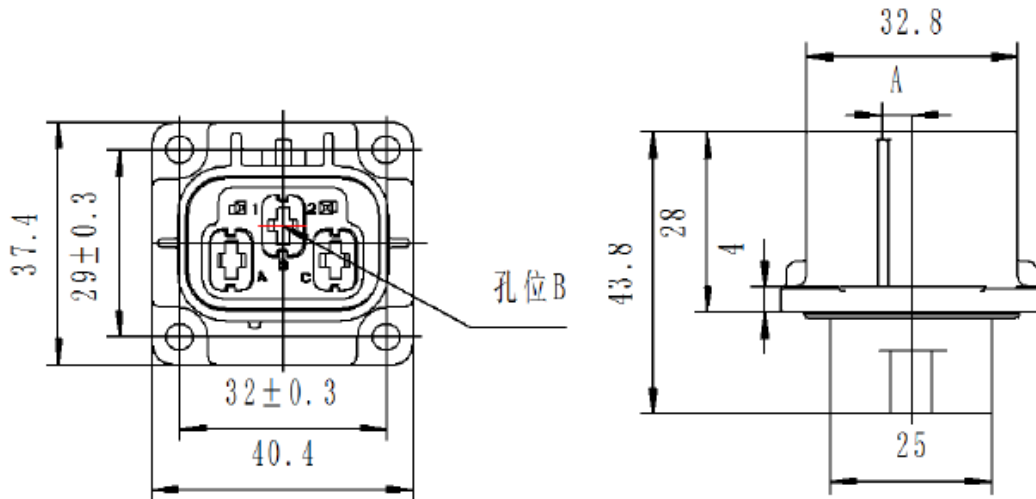


5) A/C socket as shown in the figure below:



**Port definition**                      **Signal pin**  
 端口定义: A-AC+, B-AC-, 信号针 1/2-HVIL+/-

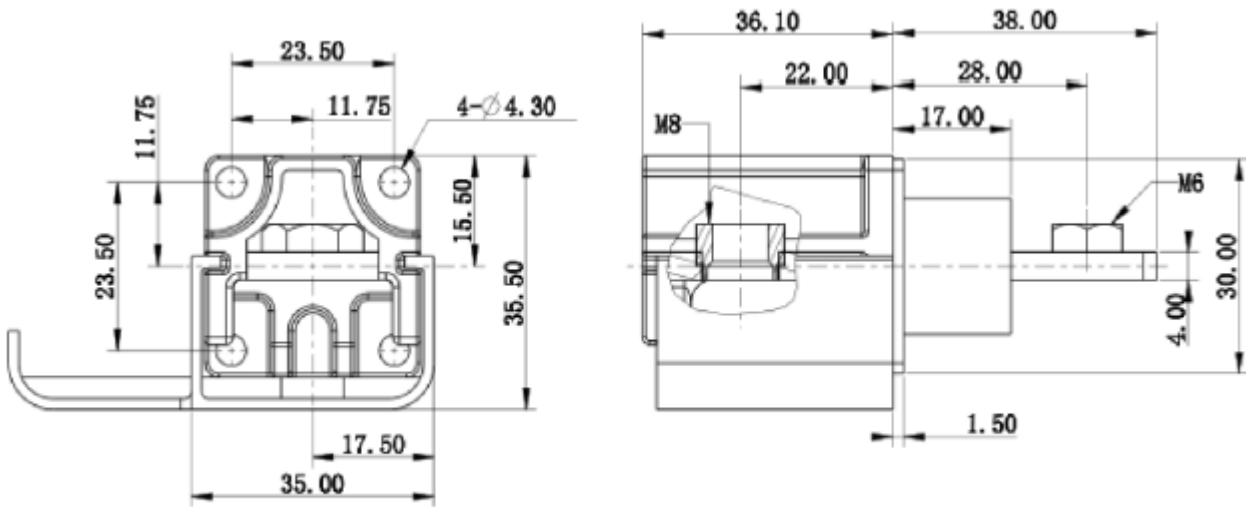
6) OBC socket as shown in the figure below:



**Port definition**                      **Signal pin**  
 端口定义: A-L, B-PE, C-N, 信号针 1/2-HVIL+/-

7) DC+ socket as shown in the figure below:





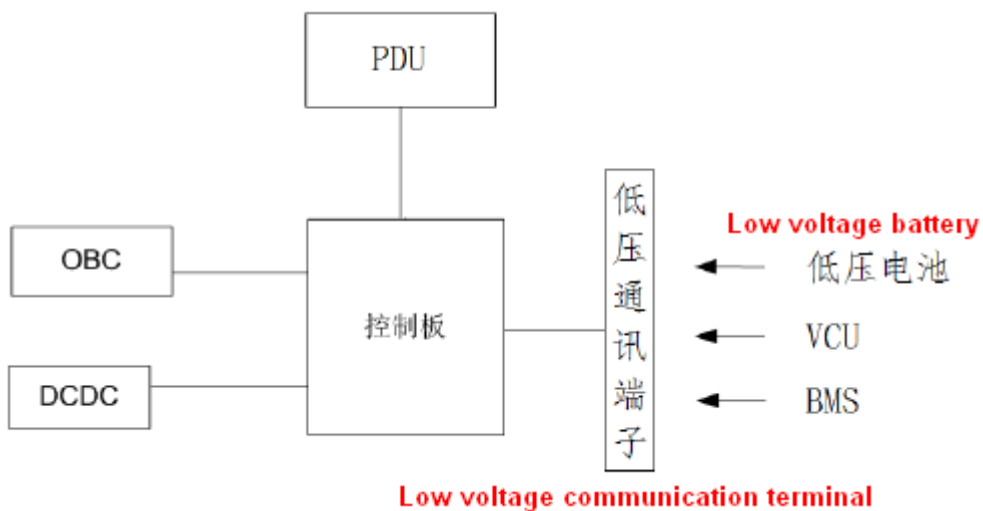
**Port definition**  
端口定义: DC+

### 5.1.3 Main circuit terminal function description

Terminal identification	Owning module	Terminal function description
lithium battery	PDU	JONHON EVH1A H2ZJ WA Lithium battery terminal, 2-pin socket
MCU	PDU	JONHON EVH1A F2ZJ M6 WA MCU terminal, 2-pin socket
Fast charge	PDU	JONHON GYHF 2 250Z BG006 fast charge terminal, 2-pin socket
A/C	PDU	JONHON HVIL F2P(16A) A 1 air compressor terminal, 2-pin socket
PTC	PDU	JONHON HVIL F2P(16A) A 3 PTC terminal, 2-pin socket
OBC input	OBC	JONHON HV02 F3P(40A) MA 1 Single-phase AC input L wire, PE wire, N wire, 3 Core socket
DC output positive	DCDC	SCED S309 151942 200 DCDC output 14V+14V+, single core socket
DC output negative	DCDC	M8 terminal, DCDC output 14V -, the negative pole is connected to the case, and the stud is provided

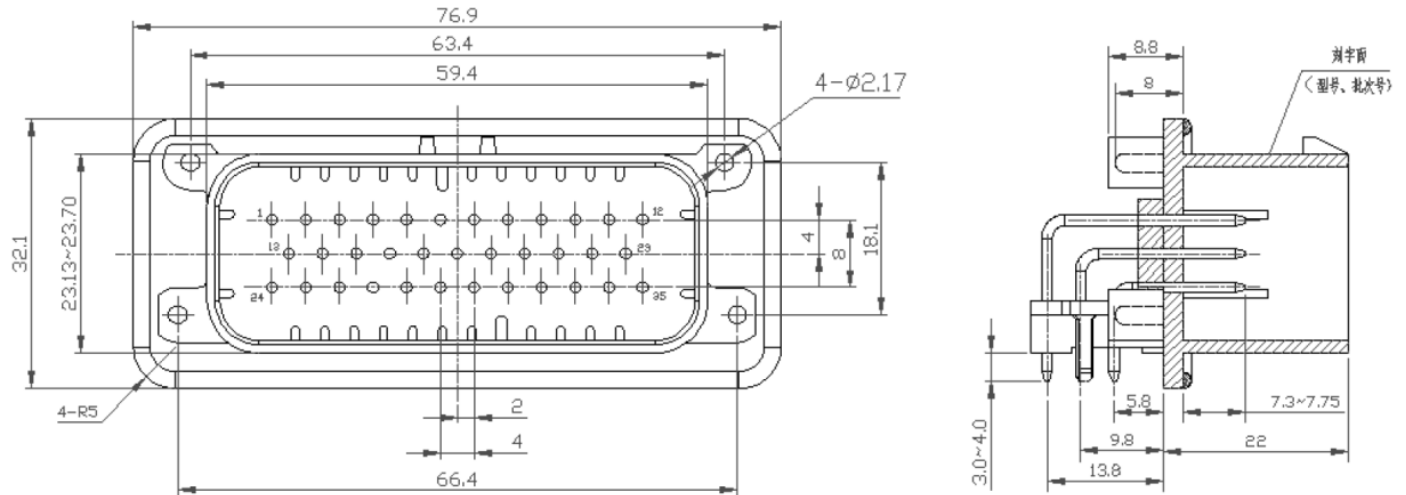
## 5.2 Control circuit terminal composition

### 5.2.1 Logic block diagram of control loop



### 5.2.2 Schematic diagram of control terminals

The signal connector is shown in the figure below:



### 5.2.3 Control terminal function definition

Connector	Pin	Description	Type	Remark	
Low voltage communication terminal, Guoweitong GVT03 RA013 35F L02	1				
	2				
	3	LOCKING_MOTOR+	Charge gun electronic lock drive signal positive PWM	PWM	
	4	LOCKING MOTOR SENSE	Electronic lock status detection	Logic electricity	
	5	LOCKIING_MOTOR	Charge gun electronic lock drive signal negative	PWM	
	6				
	7				
	8				
	9	HVIL+	High voltage interlock detection +	PWM	
	10	HVIL-	High voltage interlock detection -	PWM	
	11				
	12				
	13				
	14	HW_WAKE_UP	OBC output high level	Logic level	OBC output high level to wake up BMS
	15	KL15_DC	DCDC input high level	Power supply	Wake up DCDC in ON mode
	16				
	17				
	18				
	19				
	20	KM_OBC	OBC relay control, low-	Logic level	

			side drive		
21	KM_DCDC		DCDC relay control, high-side drive	Logic level	
22					
23					
24	KL31		DCDC&OBC control board power supply negative, 12V power supply --, grounding	Power supply	Normal electricity, grounding
25	KL30		DCDC&OBC control board power supply positive, 12V power supply+	Power supply	Normal electricity
26	CAN_L		CAN bus, used for normal communication between DCDC&OBC and body CAN network	PWM	
27	CAN_H		CAN bus, used for normal communication between DCDC&OBC and body CAN network	PWM	
28	CS_CCS+		Fast charge auxiliary contact+	Logic level	Adhesion detection output to BMS
29	CS_CCS-		Fast charge auxiliary contact-	Logic level	Adhesion detection output to BMS
30	KM_Pre		Pre-charged contactor control signal, low-side drive	Logic level	
31	KM_MCU		MCU contactor control signal, high-side drive	Logic level	
32	KM_CCS		Fast charge contactor control signal, high-side drive	Logic level	
33	OBC_13.8V		OBC auxiliary power output negative, grounding	Power supply	OBC auxiliary power output negative ground
34					
35	OBC_13.8V+		OBC auxiliary power output positive	Power supply	OBC auxiliary power output positive

## 6 Software function planning

### 6.1 DCDC control

Wake-up function

Host computer adjustment

Port programming

CAN online burning (post-stage)

CAN boot and hard-wire boot are compatible

Fault diagnosis

### 6.2 OBC control

Host computer adjustment

Port programming  
CAN online burning (post-stage)  
Fault diagnosis

### 6.3 Communication

All the way

CAN HCM DCDC module and OBC module share one CAN line, usually connected to power CAN.

CAN bus baud rate 500kbps

Consider EMC design of communication line

### 7 Structural design and technology

Die-cast box

Water cooling, outer diameter of water inlet and outlet  $\Phi$  20 mm

The size of the box body is about 381\*320\*196 mm

Net weight of the whole machine  $15 \pm 1$  kg

The safety clearance requires high pressure to low pressure, and high pressure to the casing 5 mm

Meet the anti-vibration requirements

Easy to install and wire

Appearance needs to be confirmed with the customer

### 8 Reliability requirements

#### 8.1 EMC requirements

Radiation disturbance characteristics should comply with GB/T 18655 2010 "Radio disturbance characteristics for vehicles, ships and internal combustion engines"

Requirement of Level 3 of Limits for Radiation Disturbance from Parts and Components in "Limits and Measurement Methods for the Protection of Vehicle-mounted Receivers"

Conducted disturbance current method should comply with GB/T 18655 2010 "Radio disturbance characteristics of vehicles, ships and internal combustion engines"

The requirements of the third level of the limit of component disturbance in "Limits and Measurement Methods for the Protection of Vehicle-mounted Receivers";

Conducted disturbance test, voltage method, the charging mode of the charger should conform to ECE R10

The requirements of the fifth edition of the harassment limit of parts and components in the Uniform Provisions of the Certificate;

Remarks: Follow customer requirements specifically required by customers

#### 8.2 Safety requirements

Item	Description		Standard (or test condition)	Remark
1	Dielectric strength	Input - Output	2800 V DC 5 mA/ 1min	Should be able to withstand DC voltage 2800V, 1 minute, leakage current $\leq 5$ mA, no breakdown or arcing
		Input - Chassis	2800 V DC 5 mA/ 1min	Should be able to withstand DC voltage 2800V, 1 minute, leakage current $\leq 5$ mA, no breakdown or arcing
2	Insulation resistance	Input - Chassis	$\geq 20$ M $\Omega$ @5 00 Vdc	Insulation resistance between the high-voltage live part and the case: 20 M $\Omega$
3	Ground resistance		$< 0.1$ $\Omega$	40A/2min

### 8.3 Environmental and reliability test requirements

Item	Description	Technical Requirement	Executive standard number
1	Low temperature test	Meet the standard requirements	GB/T 28046.4-2011
2	High temperature test	Meet the standard requirements	GB/T 28046.4-2011
3	Temperature gradient	Meet the standard requirements	GB/T 28046.4-2011
4	Temperature cycle	Meet the standard requirements	GB/T 28046.4-2011
5	Rapid changes in temperature with a prescribed conversion time	Meet the standard requirements	GB/T 28046.4-2011
6	Ice water impact test	Meet the standard requirements	GB/T 28046.4-2011
7	Salt spray test	Meet the standard requirements	GB/T 28046.4-2011
8	Damp heat cycle	Meet the standard requirements	GB/T 28046.4-2011
9	Steady state damp heat	Meet the standard requirements	GB/T 28046.4-2011
10	Flowing mixed gas corrosion test	Meet the standard requirements	GB/T 28046.4-2011
11	Overvoltage	Meet the standard requirements	GB/T 28046.2-2011
12	Slow drop and rise of power supply voltage	Meet the standard requirements	GB/T 28046.2-2011
13	Supply voltage interruption	Meet the standard requirements	GB/T 28046.2-2011
14	Reverse voltage	Meet the standard requirements	GB/T 28046.2-2011
15	Open circuit test	Meet the standard requirements	GB/T 28046.2-2011
16	Short circuit protection	Meet the standard requirements	GB/T 28046.2-2011
17	vibration	Meet the standard requirements	GB/T 28046.3-2011
18	Shock	Meet the standard requirements	GB/T 28046.3-2011

## 9 Product installation, operation and maintenance

### 9.1 Installation

Installed on

In the front compartment of the vehicle, it is fixed on a fixed tripod.

### 9.2 Operation

Before wiring the controller terminals, all power supplies connected to the controller must be cut off. After the power is cut off

The waiting time is not shorter than the time marked on the controller

When the controller is running, there is a high voltage inside, and any operation on the controller is prohibited

When using the power-off start function, the controller may start on its own. It is forbidden to approach the controller and the motor

This equipment cannot be used as an emergency stop device

This equipment cannot be used for emergency braking of the motor, and a mechanical brake device must be installed

Don't frequently open and close the controller input power

Before the main power supply is powered on and run, it must be checked, the insulation measured with a multimeter, and the voltage withstand test if possible

Then try again

### 9.3 Maintenance

The maintenance, inspection or component replacement of the controller must be carried out by trained and qualified professionals

Before wiring the controller terminals, all power supplies connected to the inverter must be cut off. After the power is cut off,

The waiting time is not shorter than the time marked on the controller

In the process of maintenance, maintenance and component replacement, measures must be taken to prevent screws, cables and other conductive objects from entering

Inside the controller

During maintenance, maintenance and component replacement, it is necessary to avoid the controller and components from contacting or attaching flammable materials

It is not possible to test the insulation and withstand voltage of the controller, and cannot use a megohmmeter to test the control circuit of the controller

In the process of maintenance, maintenance and component replacement, anti-static measures must be taken for the controller and internal components

## 10 Production, testing, marking, packaging and transportation of products

### 10.1 Manufacturability requirements

Working tools are commonly used sockets, wrenches, screw cutters, forklifts, etc.

Multiple people are required to coordinate production and assembly. Install as a component first, then as a unit

Install in accordance with the process instructions

### 10.2 Testability requirements

Single board test meets the requirements of automatic test on tooling

System testing requires complete testing of the electrical performance and control performance of the entire system, including the power-on sequence of the system,

For terminal function, host computer function, full load test, etc., please refer to the production debugging instructions

### 10.3 Logo

Controller

Nameplate requirements

Meet customer customization requirements

Comply with relevant high temperature resistance, silk screen anti-wiping requirements

Controller manufacturer name model, serial number

Controller main parameters: rated input voltage, rated output voltage, rated output current, rated capacity

### 10.4 Packaging requirements

machine

Put a film plastic bag on the corners with some EPE liners, and use brown carton packaging.

### 10.5 Transportation requirements

The transportation tools and methods that can be used for this product include: cars, trains, airplanes, etc.

, If the product needs to be exported

You need to separately demand packaging.

## 11 Other design requirements

### 11.1 ROHS requirements

ROHS grade	Is it satisfied	Description
R6	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Material meets ROHS, lead-free process

### 11.2 Optional accessories specifications and models

not involving

## 12 Referenced standards and specifications

G B/T 191 2008 Packaging and storage pictorial mark

GB 4208 2008 Enclosure protection grade (IP code)

GB/T 9969 2008 Industrial Product Manual General Principles

QC/T 413 2002 Basic technical requirements for automotive electrical equipment

QC/T 895 2011 Conductive on-board charger for electric vehicles

GB T18384.3 2015 Electric Vehicle Safety Requirements Part 3 Personnel Protection Against Electric Shock

GB/T24347 2009 DC/DC converter for electric vehicles

GB/T4943.1 2011 Information Technology Equipment Safety Part 1 General Requirements

GB/T 17626.11 2008 Electromagnetic compatibility test and measurement technology Voltage sag, short-term

interruption and voltage change immunity test

GB/T 18655 2010 Limits and measurement methods of radio disturbance characteristics of vehicles, ships and internal combustion engines used to protect on-board receivers

CISPR 25 2008 Limits and measurement methods of radio disturbance characteristics used to protect vehicle receivers

ISO7637 2 2004 Transient conducted interference immunity test of power cord

GB/T 30512 "Requirements for Prohibited Substances in Automobiles" complete product testing of prohibited substances

GB/T 19515 "Calculation Method for Reusability and Recyclability of Road Vehicles" tests the requirements for recyclability

GB/T 28675 "Auto Parts Remanufacturing Dismantling" requires dismantling

GB/T 28046.2 "Environmental Conditions and Tests of Road Vehicles, Electrical and Electronic Equipment" 4.11

4.3.2 in GB/T 28046.3 "Environmental Conditions and Tests of Road Vehicles, Electrical and Electronic Equipment"

GB/T 28046.4 "Environmental conditions and tests for road vehicles, electrical and electronic equipment"